

Appendix D

Field Cost Estimates

**Priest Rapids Intake, Pumping Plant, Switchyard
and Inflow Conveyance System**

Q= 3,500 cfs

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

Summary Sheet 1 of 2

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Estimate Worksheets Identify One Type of Intake and Pumping Plant and Two Types of Discharge Line Options					
		Discharge 1: Tunnel/Tunnel Inflow Line to BRR					
		Discharge 2: Tunnel/Pipeline Inflow Line to BRR					
		OPTION 1: PUMPING PLANT PLUS DISCHARGE 1: TUNNEL/TUNNEL					
		Intake - Civil/Structural Subtotal					\$48,109,150.00 ✓
		Intake - Mechanical/Electrical Subtotal					\$9,926,770.00 ✓
		Plant - Civil/Structural Subtotal					\$63,295,370.00 ✓
		Plant - Mechanical Subtotal					\$93,929,850.00 ✓
		Plant - Electrical Subtotal					\$5,413,850.00 ✓
		Switchyard & Transmission Line Subtotal					\$20,280,000.00 ✓
		Discharge 1 - Subtotal					\$186,471,700.00 ✓
		Subtotal					\$427,426,690.00 ✓
		Mobilization +/- 5%					\$21,000,000.00 ✓
		Subtotal w/ mobilization					\$448,426,690.00 ✓
		Unlisted Items +/- 10%					\$41,573,310.00 ✓
		OPTION 1: CONTRACT COST					\$490,000,000.00 /
		Contingencies +/- 25%					\$130,000,000.00 /
		OPTION 1: FIELD COST					\$620,000,000.00 /
QUANTITIES			PRICES				
BY	CHECKED		BY	CHECKED			
			<i>g</i> Craig A. Grush Elizabeth Tran	<i>BW</i> 8/17/04			
DATE PREPARED	PEER REVIEW		DATE PREPARED	PEER REVIEW			
			08/17/04	<i>ded</i> 8/17/04			

ESTIMATE WORKSHEET

FEATURE:				PROJECT:			
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs Summary Sheet 2 of 2				Yakima River Basin Water Storage Options			
				REGION PN		PRICE LEVEL: Appraisal	
				FILE: C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary			
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		OPTION 2: PUMPING PLANT PLUS DISCHARGE 2: TUNNEL/PIPELINE					
		Intake - Civil/Structural Subtotal					\$48,109,150.00 ✓
		Intake - Mechanical/Electrical Subtotal					\$9,926,770.00 ✓
		Plant - Civil/Structural Subtotal					\$63,295,370.00 ✓
		Plant - Mechanical Subtotal					\$93,929,850.00 ✓
		Plant - Electrical Subtotal					\$5,413,850.00 ✓
		Switchyard & Transmission Line Subtotal					\$20,280,000.00 ✓
		Discharge 2 - Subtotal					\$357,838,420.00 ✓
		Subtotal					\$598,793,410.00 ✓
		Mobilization	+/-	5%			\$30,000,000.00 ✓
		Subtotal w/ mobilization					\$628,793,410.00 ✓
		Unlisted Items	+/-	10%			\$61,206,590.00 ✓
		OPTION 2: CONTRACT COST					\$690,000,000.00 ✓
		Contingencies	+/-	25%			\$170,000,000.00 ✓
		OPTION 2: FIELD COST					\$860,000,000.00 ✓
QUANTITIES				PRICES			
BY		CHECKED		BY		CHECKED	
				g Craig A. Grush Elizabeth Tran		BOV 8/17/04	
DATE PREPARED		PEER REVIEW		DATE PREPARED		PEER REVIEW	
				08/17/04		BOV 8/17/04	

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs			Yakima River Basin Water Storage Options				
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			FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
Intake- Structural			CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Structural Excavation and Backfill					
		Assume dam excavation is all common.					
		Assume top 5 feet of excavation is common and the remainder is rock					
		Assume stockpile and use for backfill or embankment.					
		7 Excavation of common materials for structures	D8140	388,500	CY	\$6.00	\$2,331,000.00
		8 Excavation of rock for structures (drill & shoot)	D8140	671,700	CY	\$15.00	\$10,075,500.00
		9 Furnish & place backfill for structures (assume local borrow)	D8140	35,800	CY	\$4.00	\$143,200.00
		10 Place backfill around structures	D8140	35,800	CY	Included above	
		11 Compact backfill around structures	D8140	35,800	CY	\$5.00	\$179,000.00
		Roads and Fencing					
		12 Gravel surfacing		2,270	TONS	\$20.00	\$45,400.00
		20 ft wide road right side of channel					
		12 ft wide road left side of channel					
		13 Safety fencing		4,750	LF	\$20.00	\$95,000.00
		8' chainlink fence					
		STRUCTURAL					
		Construct Gated Intake and Fishscreen Structure					
		14 Furnish, form, and place reinforced concrete (f'c=4ksi)	D8140	40,150	CY	\$350.00	\$14,052,500.00
		15 Furnish and place concrete reinforcement.	D8140	6,424,000	LBS	\$0.75	\$4,818,000.00
		16 Furnish and handle cement	D8140	11,325	TONS	\$110.00	\$1,245,750.00
		Construct Lined Intake Canal					
		17 Furnish, form, and place unreinforced concrete	D8140	2,350	CY	\$350.00	\$822,500.00
		lining in excavated channel (f'c= 3 ksi)					
		18 Furnish and handle cement	D8140	665	TONS	\$140.00	\$93,100.00
		Construct Bypass Pipe					
		19 3 - 54" Dia. steel pipe for fish bypass.		15,840	LF	\$330.00	\$5,227,200.00
		Mortar line pipe					
		20 Bypass pipe common excavation		270,000	CY	\$5.00	\$1,350,000.00
		21 Bypass pipe rock excavation		130,000	CY	\$15.00	\$1,950,000.00
		22 Bypass pipe backfill		380,000	CY	\$7.00	\$2,660,000.00
		23 Bypass pipe soil cement bedding (100 psi)		12,000	CY	\$55.00	\$660,000.00
		Miscellaneous Metalwork					
		Listed under Intake - Mechanical Items					
		Intake - Civil/Structural Subtotal					\$48,109,150.00
QUANTITIES			PRICES				
BY	CHECKED	BY	CHECKED				
Chou Cha	David Gesundheit/Anne Pavol	Craig A. Grush	BOV 8/17/04				
DATE PREPARED	PEER REVIEW	DATE PREPARED	PEER REVIEW				
4/19/04		08/17/04	ACD				

ESTIMATE WORKSHEET

FEATURE:			PROJECT:					
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs			Yakima River Basin Water Storage Options					
			REGION		PN	PRICE LEVEL:		Appraisal
			FILE:					
Intake- Mechanical			C:\Documents and Settings\bjvinotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary					
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		Mechanical						
	1	Furnish and install steel stoplog guides and seats (upstream of radial gates)	D8410	13,500	LBS	\$6.00	\$81,000.00	
	2	Furnish and install steel trashracks	D8410	102,000	LBS	\$4.00	\$408,000.00	
	3	Furnish and install one trash rake, rails, supports (assume Atlas Polar DT8300 rake)	D8410	21,000	LBS	\$10.00	\$210,000.00	
	4	Furnish and install one conveyor, steel	D8410	13,000	LBS	\$10.00	\$130,000.00	
	5	Furnish and install steel fish screen guides, supports, embedded seats, and bypass walls	D8410	360,000	LBS	\$4.00	\$1,440,000.00	
	6	Furnish and install fish screens, 10' W x 14' H panel	D8410					
		70 panels + 6 spares						
		Structural steel		106,400	LBS	\$4.00	\$425,600.00	
		Stainless steel		106,400	LBS	\$15.00	\$1,596,000.00	
	7	Furnish and install barrier panels above fish screens	D8410					
		10' W x 11' H panels, 70 panels + 6 spares						
		Structural steel		209,000	LBS	\$4.00	\$836,000.00	
	8	Furnish and install adjustable baffle panels	D8410					
		10' W x 25' H panels, 70 panels + 6 spares						
		Structural steel		570,000	LBS	\$4.00	\$2,280,000.00	
	9	Furnish and install fish screen cleaners with travel rail,	D8410					
		5 systems with 2 brush cleaner arms per system						
		a. Structural steel		40,000	LBS	\$4.00	\$160,000.00	
		b. Stainless steel		2,500	LBS	\$20.00	\$50,000.00	
		c. 2 Hp motors/gear reducers, with adj. speed controllers, and limit switches		5	UNITS	\$5,000.00	\$25,000.00	
	10	Furnish and install water level measuring systems	D8410	12	UNITS	\$11,000.00	\$132,000.00	
		Sheet Subtotal					\$7,773,600.00	
QUANTITIES			PRICES					
BY		CHECKED	BY		CHECKED			
R Christensen/B Sund		<i>Amr</i>	<i>Craig A. Grush</i>		BOV 8/17/04			
DATE PREPARED		PEER REVIEW	DATE PREPARED		PEER REVIEW			
4/21/2004			08/17/04		<i>BOV</i>			

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PROJECT:

Yakima River Basin Water Storage Options

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Revisions\Priest Rapids PP_3500 Rev 1.x\Summary

Intake- Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	11	Furnish and install steel stoplog guides and seats (downstream of fish screens)	D8410	13,500	LBS	\$6.00	\$81,000.00
	12	Furnish and install one set of steel stoplogs for the two different size bays with lifting beam	D8410	101,000	LBS	\$4.00	\$404,000.00
	13	3' wide walkway, steel, safety grating along fish screens	D8410	19,500	LBS	\$7.00	\$136,500.00
	14	Handrail along each side of fish screen walkway	D8410	1,520	LF	\$50.00	\$76,000.00
		Radial Gates in Intake Structure					
		Furnish and install two 36.5-ft x 8.5-ft top seal radial gates and hoist equipment:	D8420				
	15	Gate (Weight/gate= 34,650 lbs)		69,120	LBS	\$8.00	\$552,960.00
	16	Embedded metalwork (Weight/bay= 5,000 lbs)		10,000	LBS	\$5.00	\$50,000.00
	17	Hoist operator (Weight/gate operator= 11,300 lbs)		22,600	LBS	\$20.00	\$452,000.00
	18	Motor - 5 hp (One per gate)		2	EA	Included in operator \$	
		Furnish and install one 15.0-ft x 8.5-ft top seal radial gate and hoist equipment:	D8420				
	19	Gate (Weight/gate= 20,790 lbs)		20,790	LBS	\$8.00	\$166,320.00
	20	Embedded metalwork (Weight/bay= 3,000 lbs)		3,000	LBS	\$5.00	\$15,000.00
	21	Hoist operator (Weight/gate operator= 6,150 lbs)		6,150	LBS	\$20.00	\$123,000.00
	22	Motor - 3 hp		1	EA	Included in operator \$	
		Sheet Subtotal					\$2,056,780.00

QUANTITIES

PRICES

BY	R Christensen/B Sund (D8410) P. Hoffman (D8420)	CHECKED	<i>Amr</i>	BY	<i>G</i> Craig A. Grush	CHECKED	<i>604 8/17/04</i>
DATE PREPARED	4/21/2004	PEER REVIEW		DATE PREPARED	08/17/04	PEER REVIEW	<i>Dec</i>

ESTIMATE WORKSHEET

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Intake- Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Service Equipment (F&I)	D8430				
	23	Distribution panelboard, outdoor type 480 volts, 3-phase with 225 ampere bus		1	EA	\$25,000.00	\$25,000.00
	24	Outdoor transformer load center 15 kVA, 1-phase, 480-240/120 volt		1	EA	\$11,000.00	\$11,000.00
		Combination Motor Starters	D8430				
	25	NEMA size 2 non-reversing contactor, 480-120 volt control transformer NEMA type 4 enclosure		6	EA	\$8,000.00	\$48,000.00
		Insulated Conductors (F&I)					
		600-volt, single-conductor, stranded copper					
	26	12 AWG		500	LF	\$0.60	\$300.00
	27	10 AWG		200	LF	\$0.70	\$140.00
	28	8 AWG		100	LF	\$1.00	\$100.00
		Conduit System (F&I)					
		Rigid steel conduit					
	29	1 inch		150	LF	\$15.00	\$2,250.00
		Lighting System (F&I)	D8430				
	30	High-pressure sodium, pole mounted, outdoor 70 watt, 120 volt		6	EA	\$1,600.00	\$9,600.00
		Intake - Mechanical/Electrical Subtotal					\$9,926,770.00

QUANTITIES			PRICES		
BY	CHECKED	BY	CHECKED	DATE PREPARED	PEER REVIEW
Mike Schuh	L Roni	Elizabeth Tran	BOV 8/17/04	08/17/04	BOV
DATE PREPARED	PEER REVIEW	DATE PREPARED	PEER REVIEW		
4/16/04		08/17/04			

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FILE:

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Plant- Civil

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Road (9.75 miles of 2-lane access road):					
		Assume construct access road from SH24 to PP.					
		Assume place road along abandoned railroad alignment					
		Assume no major excavation or embankment sections.					
	1	Clear roadway alignment	D8140	45	AC	\$3,500.00	\$157,500.00
	2	Furnish and place base course material (9-inch depth)	D8140	96,000	TONS	\$16.00	\$1,536,000.00
	3	Furnish and place asphalt concrete (6-inch depth)	D8140	70,000	TONS	\$60.00	\$4,200,000.00
	4	Furnish and install W-beam type guardrail	D8140	10,000	LF	\$25.00	\$250,000.00
	5	Furnish and install miscellaneous pipe culverts	D8140	1,000	LF	\$200.00	\$200,000.00
		Assume 36-inch-diameter, w/ft= 35#/ft)					
		Service Yard (6" asphalt concrete surface)					
	6	Strip and clear pumping plant site to 1 foot depth	D8120	15,300	CY	\$3.00	\$45,900.00
	7	Common excavation to Service Yard El. 505.0	D8120	164,000	CY	\$5.00	\$820,000.00
	8	Rock excavation to Service Yard El. 505.0	D8120	208,000	CY	\$15.00	\$3,120,000.00
	9	Place and compact embankment for service yard	D8120	19,200	CY	\$8.00	\$153,600.00
	10	Furnish and place base course material (6-inch)	D8120	10,000	TONS	\$20.00	\$200,000.00
	11	Furnish and place asphalt concrete (6-inch)	D8120	11,000	TONS	\$80.00	\$880,000.00
	12	Furnish and install 7-foot chain link fence for PP Yard	D8120	3,100	LF	\$20.00	\$62,000.00
	13	Furnish and install 7-foot x 24-foot access gate	D8120	3	EA	\$3,500.00	\$10,500.00
		Dewatering During Construction:					
		Assume no groundwater flows into excavation.					
		Structural Excavation and Backfill					
		Assume all common material excavated under site excavation for yard.					
		Assume stockpile rock for later use as riprap or rockfill.					
	14	Excavation of rock for structures (drill & shoot)	D8120	200,000	CY	\$15.00	\$3,000,000.00
	15	Furnish backfill for structures (assume local borrow)	D8120	40,000	CY	\$4.00	\$160,000.00
	16	Place backfill around structures	D8120	40,000	CY	Included above	
	17	Compact backfill around structures	D8120	40,000	CY	\$5.00	\$200,000.00
	18	Rock Exc. for manifold pipe to edge of Service Yard	D8120	78,000	CY	\$15.00	\$1,170,000.00
	19	Furnish, place, & compact backfill for manifold pipe trench(assu	D8120	63,480	CY	\$9.00	\$571,320.00
	20	Furnish & place soil cement for manifold pipe trench	D8120	8,160	CY	\$55.00	\$448,800.00
		Sheet Subtotal					\$17,185,620.00

QUANTITIES

PRICES

BY

Dick LaFond

M.R. O'Shea

CHECKED

M.R. O'Shea

BY

Craig A. Grush

CHECKED

BOL 8/17/04

DATE PREPARED

4/19/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

BOL

ESTIMATE WORKSHEET

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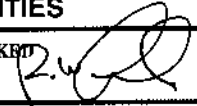

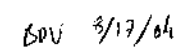

Appraisal

FILE:

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Plant- Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Building Structure					
	21	Furnish, form, and place reinforced concrete	D8120	91,300	CY	\$350.00	\$31,955,000.00
	22	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	10,043,000	LBS	\$0.75	\$7,532,250.00
	23	Furnish and handle cement (.2821/CY)	D8120	25,750	TONS	\$110.00	\$2,832,500.00
	24	Furnish & install precast, prestressed double tees for roof 10LDT 32+2 = 10' wide & 32" deep - 80' Span	D8120	36	EA.	\$50,000.00	\$1,800,000.00
		Structural Steel					
	25	Furnish and install structural steel (painted): crane rails, baseplates	D8120	60,000	LBS	\$4.00	\$240,000.00
		Miscellaneous Metalwork					
	26	Furnish and install miscellaneous metalwork Includes gratings, hatches, ladders, guardrails, catwalk, and cable trays and supports	D8120	250,000	LBS	\$7.00	\$1,750,000.00
		Plant - Civil/Structural Subtotal					\$63,295,370.00

QUANTITIES			PRICES		
BY	M. R. O'Shea	CHECKED 	BY	 Craig A. Grush	CHECKED  3/17/04
DATE PREPARED	4/19/04	PEER REVIEW	DATE PREPARED	08/17/04	PEER REVIEW 

ESTIMATE WORKSHEET

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PROJECT:

Yakima River Basin Water Storage Options

REGION	PN	PRICE LEVEL:	Appraisal
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Plant - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	17	CO2 High Pressure Fire Extinguishing System: 16 - 100# Storage Cylinders w/ control panel and appurtenances and 2,000 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	2	each	\$100,000.00	\$200,000.00
	18	Fire Suppression System: 10 Fire hose reels w/ 100 feet of hose 20 - Portable hand-held 20# extinguishers 12,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$200,000.00
	19	Unit Cooling Water System: 6 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 4,000 lbs. of type K copper tubing, valves & fittings 5,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$250,000.00
	20	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 3,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$50,000.00
	21	Compressed Air System: 2 - 100 cfm @ 125 psi rotary screw air compressors 1 - 250 gal. carbon steel air receiver 1 - 200 cfm air dryer 3,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$100,000.00
	22	Service Water System: 1 - Service water pump, 75 gpm @ 200 ft. of head 1 - Hydropneumatic Tank, 300 gal. 1,500 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	23	Gravity Drainage System: 50 - Floor drains, cast iron 25,000 lbs. of cast iron hub & spigot, service weight soil pipe	D-8410	1	L.S.		\$300,000.00
		Sheet Subtotal					\$1,200,000.00

QUANTITIES

PRICES

BY John Grass	CHECKED AMR	BY Craig A. Grass	CHECKED BOV 8/17/04
DATE PREPARED 4/16/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW BOV

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Plant - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	24	Plant Unwatering System: 2 - Vertical turbine type sump pump, 1000 gpm @ 50 ft hd 1 - Drainage jet type drainage pump 1,500 lbs. of type K copper tube, valves & fittings 4,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$200,000.00
	25	Domestic Water and Sanitary Waste System: 4 - Water Closets 2 - Urinal 4 - Lavatories & accessories 1 - Duplex Sewage Ejector 2,000 lbs. of cast iron hub & spigot service weight sewer pipe 800 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	26	100-Ton overhead crane, 72'-6" span	D8410	153,000	LBS	\$6.00	\$918,000.00
	27	200-Ton overhead crane, 72'-6" span, two required	D-8410	520,000	LBS	\$6.00	\$3,120,000.00
	28	Electric traction elevator overhead, geared, capacity = 3500 pounds, travel = 100 feet, landings = 6, speed = 200 ft/min.	D8410	1	unit	\$500,000.00	\$500,000.00
	29	Ultrasonic flowmeter, 4-path	D8410	1	meter	\$35,000.00	\$35,000.00
	30	Trashracks (steel) at pumping plant	D8410	77,000	LBS	\$4.00	\$308,000.00
	31	Stoplogs, lifting beams and guides (steel) (assumes one set of stoplogs for each size bay)	D8410	45,000	LBS	\$4.00	\$180,000.00
		Sheet Subtotal					\$5,361,000.00

QUANTITIES

PRICES

BY R. Christensen, B. Sund
A. Ritt, C. Berte, P. Schlien, J. Grass

CHECKED

AMR

BY  Craig A. Grush

CHECKED

DDJ 6/17/04

DATE PREPARED

4/16/2004

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

Red

ESTIMATE WORKSHEET

[illegible]

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\ivanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

Plant-Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Plant Grounding System (F&I)	D8430				
	1	Ground rods, 10 ft, 3/4" dia., copper-clad Stranded bare-copper conductor		50	EA	\$180.00	\$9,000.00
	2	250 MCM		1,500	LF	\$5.50	\$8,250.00
	3	4/0 AWG		1,000	LF	\$4.00	\$4,000.00
	4	2/0 AWG		1,000	LF	\$3.50	\$3,500.00
	5	4 AWG		700	LF	\$2.50	\$1,750.00
		Motor Bus & Switchgear (F&I)	D8430				
	6	Main motor isolated-phase bus: 15 kV; 24,000 amperes; 3-phase; 60 hz. Self-cooled		400	LF	\$5,000.00	\$2,000,000.00
	7	Individual motor isolated-phase bus: 15 kV; 3,500 amperes; 3-phase; 60 hz. Self-cooled		150	LF	\$1,500.00	\$225,000.00
	8	15 kV; 7,000 amperes; 3-phase; 60 hz. Self-cooled		100	LF	\$2,000.00	\$200,000.00
		Motor reduced-voltage, static starting system with 15 kV, SF6 type unit circuit-breakers					
	9	3,500 amperes continuous current		3	EA	\$240,000	\$720,000.00
	10	7,000 amperes continuous current		2	EA	\$275,000	\$550,000.00
		Motor Control Equipment (F&I)	D8430				
	11	Duplex control switchboard for operation of 5 main pumping motors.		1	EA	\$200,000	\$200,000.00
		Motors					
		Listed under Plant-Mechanical					
		Sheet Subtotal					\$3,921,500.00

QUANTITIES**PRICES**

BY Mike Schuh	CHECKED <i>L Romi</i>	BY <i>G. Tran</i> Elizabeth Tran	CHECKED 60V 8/17/04
DATE PREPARED 4/16/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BCD</i>


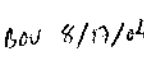

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs			Yakima River Basin Water Storage Options				
Plant-Electrical			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	19	Building Fire Detection and Alarm System (F&I)	D8430	1	LS		\$150,000.00
	20	Distribution Panelboards (F&I) 480 volts, 3-phase with 400 ampere bus	D8430	3	EA	\$80,000.00	\$240,000.00
	21	Motor Control Centers (F&I) 480 volts, 3-phase with 1200 ampere bus Five 20 inch wide sections	D8430	2	EA	\$120,000	\$240,000.00
		Insulated Conductors (F&I) 600-volt, single-conductor, stranded copper	D8430				
	22	14 AWG		12,000	LF	\$0.50	\$6,000.00
	23	12 AWG		15,000	LF	\$0.55	\$8,250.00
	24	10 AWG		15,000	LF	\$0.70	\$10,500.00
	25	6 AWG		3,000	LF	\$1.50	\$4,500.00
	26	4 AWG		3,000	LF	\$1.75	\$5,250.00
	27	1/0 AWG		2,000	LF	\$2.75	\$5,500.00
		600-volt multi-conductor control cable					
	28	9 conductor 16 AWG		2,000	LF	\$1.25	\$2,500.00
	29	12 conductor 16 AWG		3,000	LF	\$1.50	\$4,500.00
	30	5 conductor 10 AWG		3,000	LF	\$1.75	\$5,250.00
		Conduit System (F&I) Rigid steel conduit	D8430				
	31	1 inch		800	LF	\$14.00	\$11,200.00
	32	2 inch		500	LF	\$22.00	\$11,000.00
	33	2 1/2 inch		250	LF	\$30.00	\$7,500.00
	34	3 inch		250	LF	\$42.00	\$10,500.00
		Plastic-coated rigid steel					
	35	2 inch		300	LF	\$30.00	\$9,000.00
Plant - Electrical Subtotal							\$5,413,850.00
QUANTITIES			PRICES				
BY Mike Schuh		CHECKED <i>L Romi</i>	BY <i>G. For</i> Elizabeth Tran		CHECKED BOJ 4/17/04		
DATE PREPARED 4/16/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>DCB</i>		

ESTIMATE WORKSHEET

FEATURE:			PROJECT:					
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs Switchyard			Yakima River Basin Water Storage Options					
			REGION	PN	PRICE LEVEL:			Appraisal
			FILE:					C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		STRUCTURAL	D8120					
		Assume switchyard structures covered under unlisted items.						
		ELECTRICAL						
		Switchyard						
		Furnish and Install:						
	1	Oil-filled, conservator-type power transformer 320 MVA; 500-13.8kV, 1-phase	D8440	3	EA	3,850,000	\$11,550,000.00	
	2	500-kV disconnect switches, 1200 amp, 3-phase	D8440	4	EA	125,000	\$500,000.00	
	3	500-kV circuit breakers, 1200 amp, 3-phase	D8440	2	EA	1,115,000	\$2,230,000.00	
	4	Construct Transmission Line	D8440	6	MILES	1,000,000	\$6,000,000.00	
		Assume 6 miles of transmission line from Midway substation to the east 500-kV, steel towers, 2167 AWG conductor						
Switchyard & Transmission Line Subtotal							\$20,280,000.00	
QUANTITIES			PRICES					
BY		CHECKED	BY		CHECKED			
L. Gamuciello (D8440)			 Elizabeth Tran		BOV 8/17/04 			
DATE PREPARED		PEER REVIEW	DATE PREPARED		PEER REVIEW			
4/15/2004		James R. Zeiger (D8440)	08/17/04					

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 3,500 cfs

Tunnel/Tunnel Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\shvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

DISCHARGE1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Tunnel					
		Construct 34,850-ft long, 17.00-ft finished diameter, 20.00-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has three final support reaches.					
		32,150-ft long unreinforced concrete lined reach					
	1	Excavation (appr 12 cy/lf)	D-8140	32,150	lf	\$1,700.00	\$54,655,000.00
	2	Furnish and place unreinforced concrete tunnel lining	D-8140	104,000	cy	\$350.00	\$36,400,000.00
	3	Cementitious materials for concrete tunnel lining	D-8140	29,300	tons	\$100.00	\$2,930,000.00
	4	Furnish & install 7/8-in dia, 10-ft long rock bolts	D-8140	228,000	lin ft	\$45.00	\$10,260,000.00
		1,000-ft long reinforced concrete lined reach					
	5	Excavation (appr 12 cy/lf)	D-8140	1,000	lf	\$2,500.00	\$2,500,000.00
	6	Furnish and place reinforced concrete tunnel lining	D-8140	3,230	cy	\$350.00	\$1,130,500.00
	7	Cementitious materials for concrete tunnel lining	D-8140	910	tons	\$120.00	\$109,200.00
	8	Furnish and install concrete reinforcement	D-8140	50,400	lbs	\$1.00	\$50,400.00
	9	Furnish and install structural steel tunnel supports	D-8140	422,000	lbs	\$4.00	\$1,688,000.00
		1,700-ft long steel lined portal reach					
	10	Excavation (appr 12 cy/lf)	D-8140	1,700	lf	\$2,500.00	\$4,250,000.00
		Steel Tunnel Lincr:					
	10a	ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi 204" Inside Dia., 3 7/8" wall, L= 1700 ft.	D-8420	14,639,000	LBS	\$2.00	\$29,278,000.00
	11	Furnish and place backfill concrete	D-8140	5,490	cy	\$300.00	\$1,647,000.00
	12	Cementitious materials for backfill concrete	D-8140	1,550	tons	\$130.00	\$201,500.00
	13	Furnish & install 7/8-in dia, 10-ft long rock bolts	D-8140	8,400	lin ft	\$55.00	\$462,000.00
	14	Furnish and install structural steel tunnel supports	D-8140	422,000	lbs	\$4.00	\$1,688,000.00
		Sheet Subtotal					\$147,249,600.00

QUANTITIES

PRICES

BY Bill Thompson (D8140) Rick Frisz (D8420)	CHECKED KA (D8140)	BY G for: Craig A. Grush	CHECKED BOJ 8/17/04
DATE PREPARED 4/19/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW BOJ

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 3,500 cfs

Tunnel/Tunnel Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\lvannette\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

DISCHARGE1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Tunnel Outlet Features					
		Assume ~100' head to valley invert and L~ 4000'					
		Assume need to control flow from tunnel portal to bottom of reservoir during initial fill.					
		Earthwork					
	25	Excavation at outlet area for portal and channel	D8130	50,000	CY	\$15.00	\$750,000.00
	26	Excavation for pipe trench	D8130	307,000	CY	\$5.00	\$1,535,000.00
	27	Excavation for thrust block	D8130	1,500	CY	\$15.00	\$22,500.00
	28	Concrete for open channel	D8130	500	CY	\$400.00	\$200,000.00
	29	F & P reinforcement (160 lbs/CY)	D8130	83,000	LBS	\$1.00	\$83,000.00
	30	Furnish and handle cement (.282T/CY)	D8130	150	TONS	\$160.00	\$24,000.00
	31	Concrete for thrust block	D8130	1,000	CY	\$400.00	\$400,000.00
	32	F & P reinforcement (100 lbs/CY)	D8130	100,000	LBS	\$1.00	\$100,000.00
	33	Furnish and handle cement (.235T/CY)	D8130	240	TONS	\$160.00	\$38,400.00
	34	Furnish and place Zone 3 bedding for pipe	D8130	24,000	CY	\$40.00	\$960,000.00
	35	Backfill pipe with excavated material	D8130	237,000	CY	\$7.00	\$1,659,000.00
	36	Furnish and place zone 3 bedding for riprap	D8130	5,000	CY	\$40.00	\$200,000.00
	37	Furnish and place riprap	D8130	10,000	CY	\$35.00	\$350,000.00
	38	20' dia. Steel pipe L = 4000' t= 3/4 inches Wt/ft + 10% for couplings and connections	D8130	8,500,000	LBS	\$2.00	\$17,000,000.00
	39	Steel safety trashracks	D8410	80,000	LBS	\$4.00	\$320,000.00
	40	Steel Bulkhead	D8410	120,000	LBS	\$4.00	\$480,000.00
	41	Remove and salvage 20' dia. Steel pipe Assume diver-assisted removal in wet at a max depth = 100'. Assume removal of 90% of the pipe. Assume lift bags to raise pipe and barge-mounted crane to handle pipe at surface. Salvage at \$50/ton (quote), but salvage value is much less than the cost to remove and cut up pipe.	D8410	7,650,000	LBS	N/A	N/A
		Discharge 1 - Subtotal					\$186,471,700.00

QUANTITIES

PRICES

BY Doug Stanton (D8130) <i>DS</i> Rick Christensen (D8410)	CHECKED <i>BAK Amer</i>	BY <i>g</i> Craig A. Grush	CHECKED <i>BAK 8/17/04</i>
DATE PREPARED 4/27/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BAK</i>

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 3,500 cfs
Tunnel/Pipeline Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\lvvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

DISCHARGE2

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Upper Tunnel					
		Construct 11,300-ft long, 21.00-ft finished diameter, 23.67-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has one final support reach.					
		11,300-ft long unreinforced concrete lined reach					
	10	Excavation (appr 16 cy/lf)	D-8140	11,300	lf	\$2,500.00	\$28,250,000.00
	11	Furnish and place unreinforced concrete tunnel lining	D-8140	39,200	cy	\$350.00	\$13,720,000.00
	12	Cementitious materials for concrete tunnel lining	D-8140	11,000	tons	\$110.00	\$1,210,000.00
	13	Furnish & install 1-in dia, 10-ft long rock bolts	D-8140	86,820	lin ft	\$50.00	\$4,341,000.00
	14	Furnish and install structural steel tunnel supports	D-8140	619,000	lbs	\$4.00	\$2,476,000.00
		Construct Surge Shaft					
		Construct 1,380-ft deep, 16.0-ft finished diameter, 18.00-ft minimum bore diameter, shaft in rock. Shaft will be excavated by raise bore and drill down method. Water problems will be minimal. Shaft has two final support reaches.					
		1,080-ft deep unreinforced concrete lined reach					
	15	Excavation (appr 10 cy/lf)	D-8140	1,080	lf	\$4,000.00	\$4,320,000.00
	16	Furnish and place unreinforced concrete shaft lining	D-8140	2,130	cy	\$350.00	\$745,500.00
	17	Cementitious materials for concrete shaft lining	D-8140	600	tons	\$140.00	\$84,000.00
	18	Furnish & install 5/8-in dia, 6-ft long rock bolts	D-8140	38,900	lin ft	\$50.00	\$1,945,000.00
		300-ft long reinforced concrete lined shaft top reach					
	19	Excavation (appr 10 cy/lf)	D-8140	300	lf	\$4,000.00	\$1,200,000.00
	20	Furnish and place reinforced concrete shaft lining	D-8140	592	cy	\$400.00	\$236,800.00
	21	Cementitious materials for concrete shaft lining	D-8140	167	tons	\$160.00	\$26,720.00
	22	Furnish and install concrete reinforcement	D-8140	11,500	lbs	\$1.00	\$11,500.00
	23	Furnish & install 5/8-in dia, 6-ft long rock bolts	D-8140	10,800	lin ft	\$50.00	\$540,000.00
	24	Furnish and install chain link protection	D-8140	8,830	sq yd	\$20.00	\$176,600.00
		Sheet Subtotal					\$59,283,120.00

QUANTITIES

PRICES

BY <i>Met</i>	CHECKED <i>KA</i>	BY <i>G</i> Craig A. Grush	CHECKED <i>BOS</i> 8/17/04
DATE PREPARED	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>NCD</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 3,500 cfs			Yakima River Basin Water Storage Options				
Tunnel/Pipeline Option			REGION		PN	PRICE LEVEL: Appraisal	
DISCHARGE2			FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\1\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Inflow Pipe Outlet Features					
		Assume ~100' head to valley invert and L~ 4000'					
		Assume need to control flow from tunnel portal to bottom of reservoir during initial fill.					
		Earthwork					
	32	Excavation at outlet area for portal and channel	D8130	50,000	CY	\$15.00	\$750,000.00
	33	Excavation for pipe trench	D8130	307,000	CY	\$5.00	\$1,535,000.00
	34	Excavation for thrust block	D8130	1,500	CY	\$15.00	\$22,500.00
	35	Concrete for open channel	D8130	500	CY	\$400.00	\$200,000.00
	36	F & P reinforcement (160 lbs/CY)	D8130	83,000	LBS	\$1.00	\$83,000.00
	37	Furnish and handle cement (.282T/CY)	D8130	150	TONS	\$160.00	\$24,000.00
	38	Concrete for thrust block	D8130	1,000	CY	\$400.00	\$400,000.00
	39	F & P reinforcement (100 lbs/CY)	D8130	100,000	LBS	\$1.00	\$100,000.00
	40	Furnish and handle cement (.235T/CY)	D8130	240	TONS	\$160.00	\$38,400.00
	41	Furnish and place Zone 3 bedding for pipe	D8130	24,000	CY	\$40.00	\$960,000.00
	42	Backfill pipe with excavated material	D8130	237,000	CY	\$7.00	\$1,659,000.00
	43	Furnish and place zone 3 bedding for riprap	D8130	5,000	CY	\$40.00	\$200,000.00
	44	Furnish and place riprap	D8130	10,000	CY	\$35.00	\$350,000.00
	45	20' dia. Steel pipe L = 4000' t= 3/4 inches Wt/ft + 10% for couplings and connections	D8130	8,500,000	LBS	\$2.00	\$17,000,000.00
	46	Steel safety trasbracks	D8410	80,000	LBS	\$4.00	\$320,000.00
		Discharge 2 - Subtotal					\$357,838,420.00
QUANTITIES			PRICES				
BY	Doug Stanton (D8130)	CHECKED	BY	Craig A. Grush	CHECKED	BOV 3/17/04	
	Rick Christensen (D8410)						
DATE PREPARED	4/27/04	PEER REVIEW	DATE PREPARED	08/17/04	PEER REVIEW		

**Priest Rapids Intake, Pumping Plant, Switchyard
and Inflow Conveyance System
Q= 6,000 cfs**

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION**PN****PRICE LEVEL:**

Appraisal

FILE:

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Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

Summary Sheet 1 of 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Estimate Worksheets Identify one Inlet and one Outlet to Priest Rapids, one Pump/Generating Plant, one Discharge/Penstock to BRR, and one Multi-Level Intake at BRR.					
		Discharge 1: Tunnel/Tunnel Inflow Line to BRR					
		PUMP-GENERATING PLANT PLUS DISCHARGE 1: TUNNEL/TUNNEL					
		Inlet/Outlet - Civil/Structural Subtotal					\$54,437,850.00 ✓
		Inlet/Outlet - Mechanical/Electrical Subtotal					\$10,113,270.00 ✓
		PG - Civil/Structural Subtotal					\$75,889,950.00 ✓
		PG - Mechanical Subtotal					\$116,806,730.00 ✓
		PG - Electrical Subtotal					\$13,278,200.00 ✓
		Switchyard & Transmission Line Subtotal					\$20,280,000.00 ✓
		Discharge 1 - Subtotal					\$272,037,100.00 ✓
		Subtotal					\$562,843,100.00 ✓
		Mobilization +/- 5%					\$28,000,000.00 ✓
		Subtotal w/ mobilization					\$590,843,100.00 ✓
		Unlisted Items +/- 10%					\$59,156,900.00 ✓
		CONTRACT COST					\$650,000,000.00 ✓
		Contingencies +/- 25%					\$160,000,000.00 ✓
		FIELD COST					\$810,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	Craig Grush Elizabeth Tran		CHECKED	BOV 8/17/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	BOV 8/17/04

ESTIMATE WORKSHEET

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FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

Inlet/Outlet- Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Structural Excavation and Backfill					
		Assume dam excavation is all common.					
		Assume top 5 feet of excavation is common and the remainder is rock					
		Assume stockpile and use for backfill or embankment.					
	7	Excavation of common materials for structures	D8140	432,900	CY	\$6.00	\$2,597,400.00
	8	Excavation of rock for structures (drill & shoot)	D8140	717,000	CY	\$15.00	\$10,755,000.00
	9	Furnish backfill for structures (assume local borrow)	D8140	70,800	CY	\$4.00	\$283,200.00
	10	Place backfill around structures	D8140	70,800	CY	Included above	
	11	Compact backfill around structures	D8140	70,800	CY	\$5.00	\$354,000.00
		Roads and Fencing					
	12	Gravel surfacing		2,680	TONS	\$20.00	\$53,600.00
		20 ft wide road right side of channel					
		12 ft wide road left side of channel					
		2 -20 ft wide road both sides of tailrace channel					
	13	Safety fencing		5,500	LF	\$20.00	\$110,000.00
		8' chainlink fence					
		STRUCTURAL					
		Construct Gated Intake, Fishscreen Structure, and Tailrace Channel					
	14	Furnish, form, and place reinforced concrete (f _c =4ksi)	D8140	50,220	CY	\$350.00	\$17,577,000.00
	15	Furnish and place concrete reinforcement.	D8140	8,035,000	LBS	\$0.75	\$6,026,250.00
	16	Furnish and handle cement	D8140	14,160	TONS	\$110.00	\$1,557,600.00
		Construct Lined Intake Canal					
	17	Furnish, form, and place unreinforced concrete lining in excavated channel (f _c = 3 ksi)	D8140	2,350	CY	\$350.00	\$822,500.00
	18	Furnish and handle cement	D8140	665	TONS	\$140.00	\$93,100.00
		Construct Bypass Pipe					
	19	3 - 54" Dia. steel pipe for fish bypass. Mortar line pipes		15,840	LF	\$330.00	\$5,227,200.00
	20	Bypass pipe common excavation		270,000	CY	\$5.00	\$1,350,000.00
	21	Bypass pipe rock excavation		130,000	CY	\$15.00	\$1,950,000.00
	22	Bypass pipe backfill		380,000	CY	\$7.00	\$2,660,000.00
	23	Bypass pipe soil cement bedding (100 psi)		12,000	CY	\$55.00	\$660,000.00
		Miscellaneous Metalwork					
		Listed under Intake - Mechanical Items					
		Inlet/Outlet - Civil/Structural Subtotal					\$54,437,850.00

QUANTITIES**PRICES**

BY Chou Cha	CHECKED David Gesundheit/Anne Pavol	BY <i>g</i> Craig Grush	CHECKED BOV 8/17/04
DATE PREPARED 4/19/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BOV</i>

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

Inlet/Outlet- Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
		Pump Intake Channel					
	1	Furnish and install steel stoplog guides and seats (upstream of radial gates)	D8410	13,500	LBS	\$6.00	\$81,000.00
	2	Furnish and install steel trashracks	D8410	102,000	LBS	\$4.00	\$408,000.00
	3	Furnish and install one trash rake, rails, supports (assume Atlas Polar DT8300 rake)	D8410	21,000	LBS	\$10.00	\$210,000.00
	4	Furnish and install one conveyor, steel	D8410	13,000	LBS	\$10.00	\$130,000.00
	5	Furnish and install steel fish screen guides, supports, embedded seats, and bypass walls	D8410	360,000	LBS	\$4.00	\$1,440,000.00
	6	Furnish and install fish screens, 10' W x 14' H panel 70 panels + 6 spares	D8410				
		Structural steel		106,400	LBS	\$4.00	\$425,600.00
		Stainless steel		106,400	LBS	\$15.00	\$1,596,000.00
	7	Furnish and install barrier panels above fish screens 10' W x 11' H panels, 70 panels + 6 spares	D8410				
		Structural steel		209,000	LBS	\$4.00	\$836,000.00
	8	Furnish and install adjustable baffle panels 10' W x 25' H panels, 70 panels + 6 spares	D8410				
		Structural steel		570,000	LBS	\$4.00	\$2,280,000.00
	9	Furnish and install fish screen cleaners with travel rail, 5 systems with 2 brush cleaner arms per system	D8410				
		a. Structural steel		40,000	LBS	\$4.00	\$160,000.00
		b. Stainless steel		2,500	LBS	\$20.00	\$50,000.00
		c. 2 Hp motors/gear reducers, with adj. speed controllers, and limit switches		5	UNITS	\$5,000.00	\$25,000.00
	10	Furnish and install water level measuring systems	D8410	12	UNITS	\$11,000.00	\$132,000.00
		Sheet Subtotal					\$7,773,600.00

QUANTITIES

PRICES

BY

R Christensen/B Sund

CHECKED

Ane

BY

Craig Grush

CHECKED

600 8/17/04

DATE PREPARED

5/24/2004

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

B.C.D.

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

Inlet/Outlet- Mechanical

PROJECT:

Yakima River Basin Water Storage Options

REGION PN **PRICE LEVEL:** Appraisal

FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical - Pump Intake Channel (cont)					
	11	Furnish and install steel stoplog guides and seats (downstream of fish screens)	D8410	13,500	LBS	\$6.00	\$81,000.00
	12	Furnish and install one set of steel stoplogs for the two different size bays with lifting beam	D8410	101,000	LBS	\$4.00	\$404,000.00
	13	3' wide walkway, steel, safety grating along fish screens	D8410	19,500	LBS	\$7.00	\$136,500.00
	14	Handrail along each side of fish screen walkway	D8410	1,520	LF	\$50.00	\$76,000.00
		Radial Gates in Intake Structure					
		Furnish and install two 36.5-ft x 8.5-ft top seal radial gates and hoist equipment:	D8420				
	15	Gate (Weight/gate= 34,650 lbs)		69,120	LBS	\$8.00	\$552,960.00
	16	Embedded metalwork (Weight/bay= 5,000 lbs)		10,000	LBS	\$5.00	\$50,000.00
	17	Hoist operator (Weight/gate operator= 11,300 lbs)		22,600	LBS	\$20.00	\$452,000.00
	18	Motor - 5 hp (One per gate)		2	EA	Included in operator	
		Furnish and install one 15.0-ft x 8.5-ft top seal radial gate and hoist equipment:	D8420				
	19	Gate (Weight/gate= 20,790 lbs)		20,790	LBS	\$8.00	\$166,320.00
	20	Embedded metalwork (Weight/bay= 3,000 lbs)		3,000	LBS	\$5.00	\$15,000.00
	21	Hoist operator (Weight/gate operator= 6,150 lbs)		6,150	LBS	\$20.00	\$123,000.00
	22	Motor - 3 hp		1	EA	Included in operator	
		Mechanical - Turbine Tailrace Channel					
	23	Furnish and install steel stoplog guides and seats	D8410	8,500	LBS	\$5.00	\$42,500.00
	24	Furnish and install trashrack (steel)	D-8410	36,000	LBS	\$4.00	\$144,000.00
		Sheet Subtotal					\$2,243,280.00

QUANTITIES**PRICES**

BY R Christensen/B Sund (D8410) P. Hoffman (D8420)	CHECKED <i>AME</i>	BY <i>C</i> Craig Grush	CHECKED GOL 8/17/04
DATE PREPARED 5/24/2004	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Deck</i>

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION PN **PRICE LEVEL:** Appraisal

FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
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Inlet/Outlet- Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Service Equipment (F&I)	D8430				
	25	Distribution panelboard, outdoor type 480 volts, 3-phase with 225 ampere bus		1	EA	\$25,000.00	\$25,000.00
	26	Outdoor transformer load center 15 kVA, 1-phase, 480-240/120 volt		1	EA	\$11,000.00	\$11,000.00
		Combination Motor Starters	D8430				
	27	NEMA size 2 non-reversing contactor, 480-120 volt control transformer NEMA type 4 enclosure		6	EA	\$8,000.00	\$48,000.00
		Insulated Conductors (F&I)					
	28	12 AWG		500	LF	\$0.60	\$300.00
	29	10 AWG		200	LF	\$0.70	\$140.00
	30	8 AWG		100	LF	\$1.00	\$100.00
		Conduit System (F&I)					
		Rigid steel conduit					
	31	1 inch		150	LF	\$15.00	\$2,250.00
		Lighting System (F&I)	D8430				
	32	High-pressure sodium, pole mounted, outdoor 70 watt, 120 volt		6	EA	\$1,600.00	\$9,600.00
		Inlet/Outlet - Mechanical/Electrical Subtotal					\$10,113,270.00

QUANTITIES**PRICES**

BY Mike Schuh	CHECKED <i>L Romi</i>	BY <i>G for:</i> Elizabeth Tran	CHECKED <i>BOV 8/17/04</i>
DATE PREPARED 4/16/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BOV</i>

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PG - Civil

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Road (9.75 miles of 2-lane access road):					
		Assume construct access road from SH24 to PP.					
		Assume place road along abandoned railroad alignment					
		Assume no major excavation or embankment sections.					
	1	Clear roadway alignment	D8140	45	AC	\$3,500.00	\$157,500.00
	2	Furnish and place base course material (9-inch depth)	D8140	96,000	TONS	\$16.00	\$1,536,000.00
	3	Furnish and place asphalt concrete (6-inch depth)	D8140	70,000	TONS	\$60.00	\$4,200,000.00
	4	Furnish and install W-beam type guardrail	D8140	10,000	LF	\$25.00	\$250,000.00
	5	Furnish and install miscellaneous pipe culverts Assume 36-inch-diameter, w/ft= 35#/ft)	D8140	1,000	LF	\$200.00	\$200,000.00
		Service Yard (6" asphalt concrete surface)					
	6	Strip and clear pumping plant site to 1 foot depth	D8120	16,200	CY	\$3.00	\$48,600.00
	7	Common excavation to Service Yard El. 505.0	D8120	180,000	CY	\$5.00	\$900,000.00
	8	Rock excavation to Service Yard El. 505.0	D8120	220,000	CY	\$15.00	\$3,300,000.00
	9	Place and compact embankment for service yard	D8120	19,200	CY	\$8.00	\$153,600.00
	10	Furnish and place base course material (6-inch)	D8120	11,000	TONS	\$20.00	\$220,000.00
	11	Furnish and place asphalt concrete (6-inch)	D8120	12,000	TONS	\$80.00	\$960,000.00
	12	Furnish and install 7-foot chain link fence for PP Yard	D8120	3,200	LF	\$20.00	\$64,000.00
	13	Furnish and install 7-foot x 24-foot access gate	D8120	3	EA	\$3,500.00	\$10,500.00
		Dewatering During Construction:					
		Assume no groundwater flows into excavation.					
		Structural Excavation and Backfill					
		Assume all common material excavated under site excavation for yard.					
		Assume stockpile rock for later use as riprap or rockfill.					
	14	Excavation of rock for structures (drill & shoot)	D8120	246,500	CY	\$15.00	\$3,697,500.00
	15	Furnish backfill for structures (assume local borrow)	D8120	44,000	CY	\$4.00	\$176,000.00
	16	Place backfill around structures	D8120	44,000	CY	Included above	
	17	Compact backfill around structures	D8120	44,000	CY	\$5.00	\$220,000.00
	18	Rock Exc. for manifold pipe to edge of Service Yard	D8120	96,000	CY	\$15.00	\$1,440,000.00
	19	Furnish, place, & compact backfill for manifold pipe trench(assu	D8120	77,600	CY	\$9.00	\$698,400.00
	20	Furnish & place soil cement for manifold pipe trench	D8120	10,200	CY	\$55.00	\$561,000.00
		Sheet Subtotal					\$18,793,100.00

QUANTITIES

PRICES

BY Dick LaFond
M.R. O'Shea

CHECKED *R.W. O'Shea*
M.R. O'Shea

BY *G*
Craig Grush

CHECKED
DOV 8/17/04

DATE PREPARED
4/19/04

PEER REVIEW

DATE PREPARED
08/17/04

PEER REVIEW

DOV

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PG - Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Building Structure					
	21	Furnish, form, and place reinforced concrete	D8120	113,600	CY	\$350.00	\$39,760,000.00
	22	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	12,500,000	LBS	\$0.75	\$9,375,000.00
	23	Furnish and handle cement (.282T/CY)	D8120	32,035	TONS	\$110.00	\$3,523,850.00
	24	Furnish & install precast, prestressed double tees for roof 10LDT 32+2 = 10' wide & 32" deep - 80' Span	D8120	48	EA.	\$50,000.00	\$2,400,000.00
		Structural Steel					
	25	Furnish and install structural steel (painted): crane rails, baseplates	D8120	72,000	LBS	\$4.00	\$288,000.00
		Miscellaneous Metalwork					
	26	Furnish and install miscellaneous metalwork Includes gratings, hatches, ladders, guardrails, catwalk, and cable trays and supports	D8120	250,000	LBS	\$7.00	\$1,750,000.00
		PG - Civil/Structural Subtotal					\$75,889,950.00 ✓

QUANTITIES**PRICES**

BY M. R. O'Shea

CHECKED

BY

Craig Grush

CHECKED

60V 8/17/04

DATE PREPARED

4/19/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

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
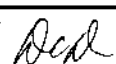
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Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PG - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Major Mechanical Equipment					
		Prices below telephone quote from Bob Rittase, Voith Hydro, 717-792-7206					
		500 cfs two-stage spiral case pump, rated 500cfs at 1430 ft total dynamic head, overall efficiency more than 83% operating range from 1030 to 1430 feet					
	1	Pumps	D8420	3	EA	\$5,000,000.00	\$15,000,000.00
	2	Motors	D8420	3	EA	\$2,500,000.00	\$7,500,000.00
	3	Spherical discharge valves, with operators, rated at 1500 ft working pressure and 2000 ft surge pressure, with operators	D8420	3	EA	\$3,000,000.00	\$9,000,000.00
	4	Installation supervision of 500 cfs pumping unit	D8420	3	EA	\$1,000,000.00	\$3,000,000.00
		1000 cfs two-stage spiral case pump, rated 1000 cfs at 1430 ft total dynamic head, overall efficiency more than 83% operating range 1030 to 1430 ft					
	5	Pumps	D8420	2	EA	\$9,000,000.00	\$18,000,000.00
	6	Motors	D8420	2	EA	\$4,500,000.00	\$9,000,000.00
	7	Spherical discharge valves, with operators, rated at 1500 ft working pressure and 2000 ft surge pressure, with operators	D8420	2	EA	\$4,500,000.00	\$9,000,000.00
	8	Installation supervision of 1000 cfs pumping unit	D8420	2	EA	\$1,500,000.00	\$3,000,000.00
		Turbines					
	9	Turbine Weight	D8420	632,000	LBS	\$13.00	\$8,216,000.00
		CF3 18-8 Stainless Runner 8.6' dia. 2 Turbines-Vertical Francis, 204,490 Hp ea. 400 rpm, 1130 ft. Design Head (Wt/Unit= 316,000 lbs)					
	10	Digital Governor, 322,600 ft.-lbs. 1,000 psi system, 2 governor systems required in total (One per unit)	D8420	2	EA	\$300,000.00	\$600,000.00
	11	2 Governor Pressure Tanks 1800 Gal. each, piping and appurtenances. (Wt/Tank= 8,470 lbs)	D8420	16,940	LBS	\$7.00	\$118,580.00
		Sheet Subtotal					\$82,434,580.00

QUANTITIES

PRICES

BY Richard Fehr Toby Turnage	CHECKED	BY  Craig Grush	CHECKED  Bob 8/17/04
DATE PREPARED 5/24/04		DATE PREPARED 08/17/04	PRER REVIEW  Bob

ESTIMATE WORKSHEET

FEATURE: Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs						PROJECT: Yakima River Basin Water Storage Options								
						REGION		PN		PRICE LEVEL:			Appraisal	
PG - Mechanical						FILE: C:\Documents and Settings\lvvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\SSummary								
PLANT ACCOUNT	PAY ITEM	DESCRIPTION				CODE	QUANTITY	UNIT	UNIT PRICE		AMOUNT			
		FURNISH-AND-INSTALL THE FOLLOWING:												
		Steel Manifold and Suction Tubes				D8420								
		Steel plate used for pipe fabrication: ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi (All pipe sizes are inside diameters)												
	12	192" Dia., 3 5/8" wall, L= 1023 ft.					7,800,000	LBS	\$2.00	\$15,600,000.00				
	13	146" Dia., 2 13/16" wall, L= 271 ft.					1,250,000	LBS	\$2.00	\$2,500,000.00				
	14	170" Dia., 1" wall, L= 134 ft.					260,000	LBS	\$2.00	\$520,000.00				
	15	120" Dia., 7/8" wall, L= 122 ft.					150,000	LBS	\$2.00	\$300,000.00				
	16	110" Dia., 2 1/8" wall, L= 305 ft.					780,000	LBS	\$2.00	\$1,560,000.00				
	17	78" Dia., 1 1/2" wall, L= 460 ft.					590,000	LBS	\$2.00	\$1,180,000.00				
	18	Turbine Guard Valves				D-8420								
		Two - 102" Dia. Spherical valve with hydraulic operators 180,000 lbs. per valve					360,000		\$10.00	\$3,600,000.00				
		Sheet Subtotal									\$25,260,000.00			
QUANTITIES						PRICES								
BY		Nathan Nakamoto, D8420				CHECKED		Rick Frisz, D8420		BY		Craig Gnush		
DATE PREPARED		4/16/04				DATE PREPARED		08/17/04		CHECKED		BOV 8/17/04		
PEER REVIEW						PEER REVIEW				PEER REVIEW		dcd		

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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PG - Mechanical




PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	19	CO2 High Pressure Fire Extinguishing System: 16 - 100# Storage Cylinders w/ control panel and appurtenances and 2,000 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	3	each	\$100,000.00	\$300,000.00
	20	Fire Suppression System: 12 Fire hose reels w/ 100 feet of hose 24 - Portable hand-held 20# extinguishers 14,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$225,000.00
	21	Unit Cooling Water System: 8 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 6,000 lbs. of type K copper tubing, valves & fittings 7,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$275,000.00
	22	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 4,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$60,000.00
	23	Compressed Air System: 2 - 100 cfm @ 125 psi rotary screw air compressors 1 - 250 gal. carbon steel air receiver 1 - 200 cfm air dryer 4,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$110,000.00
	24	Service Water System: 1 - Service water pump, 75 gpm @ 200 ft. of head 1 - Hydropneumatic Tank, 300 gal. 2,000 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$110,000.00
	25	Gravity Drainage System: 60 - Floor drains, cast iron 30,000 lbs. of cast iron hub & spigot, service weight soil pipe	D-8410	1	L.S.		\$350,000.00
		Sheet Subtotal					\$1,430,000.00

QUANTITIES

PRICES

BY John Grass	CHECKED <i>AME</i>	BY <i>g</i> Craig Grush	CHECKED BOV 8/17/04
DATE PREPARED 5/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Deid</i>

ESTIMATE WORKSHEET

FEATURE:		PROJECT:					
Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs		Yakima River Basin Water Storage Options					
PG - Mechanical		REGION PN PRICE LEVEL: Appraisal FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary					
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	26	Plant Unwatering System: 2 - Vertical turbine type sump pump, 1000 gpm @ 50 ft hd 1 - Drainage jet type drainage pump 1,500 lbs. of type K copper tube, valves & fittings 5,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$210,000.00
	27	Domestic Water and Sanitary Waste System: 4 - Water Closets 2 - Urinal 4 - Lavatories & accessories 1 - Duplex Sewage Ejector 2,000 lbs. of cast iron hub & spigot service weight sewer pipe 800 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	28	200-Ton overhead crane, 72'-6" span, two required	D-8410	520,000	LBS	\$6.00	\$3,120,000.00
	29	Electric traction elevator overhead, geared, capacity = 3500 pounds, travel = 100 feet, landings = 6, speed = 200 ft/min.	D8410	1	unit	\$500,000.00	\$500,000.00
	30	Ultrasonic flowmeter, 4-path	D8410	1	meter	\$35,000.00	\$35,000.00
	31	Trashracks (steel) at pumping plant	D8410	77,000	LBS	\$4.00	\$308,000.00
	32	Stoplogs, lifting beams and guides (steel) (assumes one set of stoplogs for each size pump bay, two sizes of bays, and assumes five sets of guides)	D8410	54,000	LBS	\$4.00	\$216,000.00
	33	Bulkhead gates, lifting beam and guides (steel) (assumes one set of bulkheads for isolation of 1 turbine) (assumes six sets of guides)	D8410	80,000	LBS	\$4.00	\$320,000.00
		Sheet Subtotal					\$4,809,000.00
QUANTITIES			PRICES				
BY R. Christensen, B. Sund A. Ritt, C. Berle, J. Grass		CHECKED 	BY  Greg Grush		CHECKED BOV 8/17/04		
DATE PREPARED 5/24/2004		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW 		

Yakima River Basin Water Storage Options

Appraisal

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls|Summary

[illegible]

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PG-Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Electrical Generator (F&I)	D8430				
	1	150,000 kVA, 13.8 kV, 3-phase, 60 Hz. 400 rpm, 95% power factor Vertical, synchronous machine Static excitation system & voltage regulator		2	EA	\$2,450,000	\$4,900,000.00
		Plant Grounding System (F&I)	D8430				
	2	Ground rods, 10 ft, 3/4" dia., copper-clad Stranded bare-copper conductor		60	EA	\$180.00	\$10,800.00
	3	250 MCM		1,500	LF	\$5.50	\$8,250.00
	4	4/0 AWG		1,200	LF	\$4.00	\$4,800.00
	5	2/0 AWG		1,200	LF	\$3.50	\$4,200.00
	6	4 AWG		1,000	LF	\$2.50	\$2,500.00
		Motor Bus & Switchgear (F&I)	D8430				
	7	Main motor isolated-phase bus: 15 kV; 24,000 amperes; 3-phase; 60 Hz. Self-cooled		300	LF	\$5,000.00	\$1,500,000.00
	8	Individual motor isolated-phase bus: 15 kV; 3,500 amperes; 3-phase; 60 Hz. Self-cooled		150	LF	\$1,500.00	\$225,000.00
	9	15 kV; 7,000 amperes; 3-phase; 60 Hz. Self-cooled		100	LF	\$2,000.00	\$200,000.00
		Motor reduced-voltage, static starting system with 15 kV, SF6 type unit circuit-breakers					
	10	3,500 amperes continuous current		3	EA	\$240,000	\$720,000.00
	11	7,000 amperes continuous current		2	EA	\$275,000	\$550,000.00
		Generator Bus & Switchgear (F&I)	D8430				
	12	Generator isolated-phase bus: 15 kV; 15,000 amperes, 3-phase; 60 Hz. Self-cooled		250	LF	\$4,000.00	\$1,000,000.00
	13	Generator unit circuit breaker 15 kV, SF6 type circuit breakers 7,000 amperes continuous current		2	EA	\$900,000	\$1,800,000.00
		Sheet Subtotal					\$10,925,550.00

QUANTITIES

PRICES

BY

Mike Schuh

CHECKED

BY

G. Tran
Elizabeth Tran

CHECKED

BDV 8/17/04

DATE PREPARED

5/20/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

Dea

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs PG-Electrical			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Motor Control Equipment (F&I)	D8430				
	14	Duplex control switchboard for operation of 5 main pumping motors.		1	EA	\$200,000	\$200,000.00
		Generator Control Equipment (F&I)	D8430				
	15	Duplex control switchboard for operation of 2 generators		1	EA	\$500,000	\$500,000.00
		Motors (Listed under Plant Mechanical)					
		15 kV Metal-Clad Switchgear (F&I)	D8430				
	16	15 kV metal-clad switchgear rated 1200 amperes with two 1200 ampere vacuum type power circuit breakers		1	EA	\$350,000	\$350,000.00
		15 kV Non-Segregated-Phase Bus (F&I)	D8430				
	17	15 kV, 1200 amperes		200	FT	\$800.00	\$160,000.00
		Plant Battery System (F&I)	D8430				
	18	125 VDC, 400 ampere-hour, lead-acid battery		1	EA	\$30,000.00	\$30,000.00
	19	Battery chargers		2	EA	\$10,000.00	\$20,000.00
	20	DC distribution panelboard, 100 ampere mains, and molded-case circuit breakers		1	EA	\$12,500.00	\$12,500.00
		Plant Station-Service Equipment (F&I)	D8430				
		Indoor double-ended secondary unit substation with following features:					
	21	Dry-type transformer 13.8 kV-480Y277 V; 3,000 KVA		2	EA	\$110,000	\$220,000.00
	22	480 V power-circuit breakers, 600 amperes		12	EA	\$4,500.00	\$54,000.00
		Building Lighting System (F&I)	D8430				
		Interior luminaires					
	23	High bay, high-pressure sodium, 400 W, 480 V		36	EA	\$700.00	\$25,200.00
	24	4 foot fluorescent lighting fixtures, 2 lamp		40	EA	\$220.00	\$8,800.00
	25	Emergency lighting system		1	LS		\$900.00
	26	Exterior luminaires		14	EA	\$400.00	\$5,600.00
		High-pressure sodium, wall mounted, outdoor 70 watt, 120 volt					
		Sheet Subtotal					\$1,587,000.00
QUANTITIES			PRICES				
BY		CHECKED	BY		CHECKED		
Mike Schuh		L Ross	Elizabeth Tran		60V 8/17/04		
DATE PREPARED		PEER REVIEW	DATE PREPARED		PEER REVIEW		
5/20/04			08/17/04		Dep		

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PG-Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	27	Building Fire Detection and Alarm System (F&I)	D8430	1	LS		\$150,000.00
	28	Distribution Panelboards (F&I) 480 volts, 3-phase with 400 ampere bus	D8430	4	EA	\$24,500.00	\$98,000.00
	29	Motor Control Centers (F&I) 480 volts, 3-phase with 1600 ampere bus Six 20 inch wide sections, 8 NEMA size 2 starters, 4 NEMA size 4 starters	D8430	2	EA	\$195,000	\$390,000.00
		Insulated Conductors (F&I) 600-volt, single-conductor, stranded copper	D8430				
30		14 AWG		12,000	LF	\$0.50	\$6,000.00
31		12 AWG		15,000	LF	\$0.55	\$8,250.00
32		10 AWG		15,000	LF	\$0.70	\$10,500.00
33		6 AWG		3,000	LF	\$1.50	\$4,500.00
34		4 AWG		3,000	LF	\$1.75	\$5,250.00
35		1/0 AWG		2,000	LF	\$2.75	\$5,500.00
		600-volt multi-conductor control cable					
36		9 conductor 16 AWG		2,000	LF	\$1.25	\$2,500.00
37		12 conductor 16 AWG		3,000	LF	\$1.50	\$4,500.00
38		5 conductor 10 AWG		3,000	LF	\$1.75	\$5,250.00
		Conduit System (F&I) Rigid steel conduit	D8430				
39		1 inch		1,000	LF	\$14.00	\$14,000.00
40		2 inch		800	LF	\$22.00	\$17,600.00
41		2 1/2 inch		400	LF	\$30.00	\$12,000.00
42		3 inch		400	LF	\$42.00	\$16,800.00
		Plastic-coated rigid steel					
43		2 inch		500	LF	\$30.00	\$15,000.00
PG - Electrical Subtotal							\$13,278,200.00

QUANTITIES

PRICES

BY Mike Schuh	CHECKED <i>L. Rom</i>	BY <i>G. Tran</i> Elizabeth Tran	CHECKED BOV 8/17/04
DATE PREPARED 5/20/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BOV</i>

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

Switchyard

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL	D8120				
		Assume switchyard structures covered under unlisted items.					
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power transformer 520 MVA; 500-13.8kV, 1-phase	D8440	3	EA	\$3,850,000	\$11,550,000.00
	2	500-kV disconnect switches, 1200 amp, 3-phase	D8440	4	EA	\$125,000	\$500,000.00
	3	500-kV circuit breakers, 1200 amp, 3-phase	D8440	2	EA	\$1,115,000	\$2,230,000.00
	4	Construct Transmission Line	D8440	6	MILES	\$1,000,000	\$6,000,000.00
		Assume 6 miles of transmission line from Midway substation to the east 500-kV, steel towers, 2167 AWG conductor					
		Switchyard & Transmission Line Subtotal					\$20,280,000.00

QUANTITIES

PRICES

BY

L. Gamuciello (D8440)

CHECKED

BY

J. Tran
Elizabeth Tran

CHECKED

80V 8/17/04

DATE PREPARED

4/15/2004

PEER REVIEW

James R. Zeiger (D8440)

DATE PREPARED

08/17/04

PEER REVIEW

sch

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

Tunnel/Tunnel

DISCHARGE1

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Tunnel					
		Construct 34,850-ft long, 17.00-ft finished diameter, 20.00-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has three final support reaches.					
		32,150-ft long unreinforced concrete lined reach					
	1	Excavation (appr 12 cy/lf)	D-8140	32,150	lf	\$1,700.00	\$54,655,000.00
	2	Furnish and place unreinforced concrete tunnel lining	D-8140	104,000	cy	\$350.00	\$36,400,000.00
	3	Cementitious materials for concrete tunnel lining	D-8140	29,300	tons	\$110.00	\$3,223,000.00
	4	Furnish & install 7/8-in dia, 10-ft long rock bolts	D-8140	228,000	lin ft	\$45.00	\$10,260,000.00
		1,000-ft long reinforced concrete lined reach					
	5	Excavation (appr 12 cy/lf)	D-8140	1,000	lf	\$2,500.00	\$2,500,000.00
	6	Furnish and place reinforced concrete tunnel lining	D-8140	3,230	cy	\$350.00	\$1,130,500.00
	7	Cementitious materials for concrete tunnel lining	D-8140	910	tons	\$120.00	\$109,200.00
	8	Furnish and install concrete reinforcement	D-8140	50,400	lbs	\$1.00	\$50,400.00
	9	Furnish and install structural steel tunnel supports	D-8140	422,000	lbs	\$4.00	\$1,688,000.00
		1,700-ft long steel lined portal reach					
	10	Excavation (appr 12 cy/lf)	D-8140	1,700	lf	\$2,500.00	\$4,250,000.00
		Steel Tunnel Liner:					
		ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi					
	11	204" Dia., 3 7/8" wall, L= 1700 ft.	D-8420	14,639,000	LBS	\$2.00	\$29,278,000.00
	12	Furnish and place backfill concrete	D-8140	5,490	cy	\$300.00	\$1,647,000.00
	13	Cementitious materials for backfill concrete	D-8140	1,550	tons	\$130.00	\$201,500.00
	14	Furnish & install 7/8-in dia, 10-ft long rock bolts	D-8140	8,400	lin ft	\$55.00	\$462,000.00
	15	Furnish and install structural steel tunnel supports	D-8140	422,000	lbs	\$4.00	\$1,688,000.00
		Sheet Subtotal					\$147,542,600.00

QUANTITIES

PRICES

BY Bill Thompson (D8140)
Rick Frisz (D8420)

CHECKED *LA*

BY *Grish*
Erug Grish

CHECKED *BAV* 8/17/04

DATE PREPARED
4/19/04

PEER REVIEW

DATE PREPARED
08/17/04

PEER REVIEW *Red*

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE: Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs			PROJECT: Yakima River Basin Water Storage Options				
			REGION PN		PRICE LEVEL: Appraisal		
			FILE: C:\Documents and Settings\bnvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary				
DISCHARGE1							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Multi-Level Intake at Black Rock Reservoir					
		CIVIL					
		Structural Excavation and Backfill					
		Assume T. O Rock is 60 feet below top of ground					
		Assume stockpile rock for later use as riprap.					
	26	Common excavation for structures	D8120	138,500	CY	\$10.00	\$1,385,000.00
	27	Rock excavation for structures (drill & shoot)	D8120	137,500	CY	\$15.00	\$2,062,500.00
	28	Furnish & install grouted pretensioned tendons	D8120	100	EA	\$30,000.00	\$3,000,000.00
		Assume 100 holes, each 60 foot deep,					
		Hole diameter= 8 inches					
		Each hole has 27 0.5-inch diameter 7-wire,					
		flow-fill, epoxy coated strand w/ ult. strength= 270 ksi					
		STRUCTURAL					
		Construct Intake Structure					
	29	Furnish, form, and place reinforced concrete	D8120	124,500	CY	\$350.00	\$43,575,000.00
	30	Furnish and place concrete reinforcement.	D8120	12,450,000	LBS	\$0.75	\$9,337,500.00
		Assume 100 #/CY					
	31	Furnish and handle cement (.282T/CY)	D8120	35,110	TONS	\$110.00	\$3,862,100.00
		Structural Steel					
	32	Furnish and install structural steel (painted):	D8120	50,000	LBS	\$4.00	\$200,000.00
		Includes monorail girder and hoist frame.					
		Miscellaneous Metalwork					
	33	Assume ladders in shafts, elevator rail supports, misc metal in valve rooms and elevator tower	D8120	50,000	LBS	\$7.00	\$350,000.00
		Construct Access Bridge					
		Assume 30-ft wide by 100-ft span					
	34	Furnish, form, and place reinforced concrete	D8120	150	CY	\$500.00	\$75,000.00
	35	Furnish and place concrete reinforcement.	D8120	19,500	LBS	\$1.00	\$19,500.00
		Assume 130 #/CY					
	36	Furnish and handle cement (.282T/CY)	D8120	45	TONS	\$160.00	\$7,200.00
	37	Furnish and install structural steel (painted):	D8120	250,000	LBS	\$4.00	\$1,000,000.00
		Sheet Subtotal					
							\$64,873,800.00
QUANTITIES			PRICES				
BY Dick laFond		CHECKED <i>M.R. O'Brien</i>		BY <i>Craig Grush</i>		CHECKED <i>BDV 8/17/04</i>	
DATE PREPARED 5/27/04		PEER REVIEW		DATE PREPARED 08/17/04		PEER REVIEW <i>DeD</i>	

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:					
Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs Discharge 1			Yakima River Basin Water Storage Options					
			REGION		PN	PRICE LEVEL:		Appraisal
			FILE:					C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		Mechanical - Multi-level Intake at BRR						
	43	15-Ton capacity, electric wire rope hoists for monorails 15 hp motors, 43 ft lift, 4 req'd @ 4100 lb each	D-8410	16,400	LBS	\$25.00	\$410,000.00	
	44	20-Ton capacity, electric wire rope hoist 30 hp motor, 380 ft lift	D-8410	8,000	LBS	\$25.00	\$200,000.00	
	45	Electric traction elevator overhead, geared, capacity = 3500 lbs, travel = 298 feet, landings = 5, speed = 500 ft/min	D-8410	1	unit	\$600,000	\$600,000.00	
	46	Stationary fish screens, 4 intake levels, R=25', L=100' Structural steel Stainless steel	D-8410	589,000 393,000	LBS LBS	\$4.00 \$15.00	\$2,356,000.00 \$5,895,000.00	
	47	Trashracks around side gate openings (steel)	D-8410	80,000	LBS	\$4.00	\$320,000.00	
	48	Bulkhead guides for isolating the two side gates (steel) (assumes no bulkheads provided)	D-8410	99,000	LBS	\$4.00	\$396,000.00	
	49	Bulkhead gates and guides for multilevel intakes (steel) (assumes guides for each inlet and one level set of 4 bulkheads)	D-8410	266,000	LBS	\$4.00	\$1,064,000.00	
		Heating, Ventilating, and Air Conditioning	D-8410	1	L.S.		\$440,850.00	
		Sheet Subtotal					\$11,681,850.00	
QUANTITIES			PRICES					
BY	P. Schlein	CHECKED <i>Amr</i>	BY	<i>g</i> Craig Grush	CHECKED	<i>BOV</i> 6/17/04		
DATE PREPARED	5/26/04	PEER REVIEW	DATE PREPARED	08/17/04	PEER REVIEW	<i>BOV</i>		

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pump/Generating Plant, Switchyard and Conveyance System To/From BRR Pump/Generate Conveyance System - Q= 3,500 cfs Tunnel/Tunnel DISCHARGE1			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Electrical Equipment					
		Service Equipment (F&I)	D8430				
	65	Dry-type distribution transformer 13.8 kV-480Y/277 volt, 225 kVA, 3-phase, 60 hz.		1	EA	\$28,000.00	\$28,000.00
	66	Distribution switchboard, indoor type 480 volt, 3-phase with 600 ampere bus Molded-case circuit breakers: 16 - 50 amp breakers 10 - 30 ampere breakers		1	EA	\$65,000.00	\$65,000.00
		Low-Voltage Distribution Equipment (F&I)	D8430				
	67	Dry-type lighting transformer 480-208Y/120 volt, 30 kVA, 3-phase, 60 hz.		2	EA	\$5,000.00	\$10,000.00
	68	Lighting panelboard, indoor type 208Y/120 volt, 3-phase with 100 ampere bus		2	EA	\$9,000.00	\$18,000.00
		Safety Switches (F&I)	D8430				
	69	480 volt, 60-ampere, 3-pole, fusible with NEMA type 12 enclosure		6	EA	\$800.00	\$4,800.00
		Sheet Subtotal					\$125,800.00
QUANTITIES			PRICES				
BY M. Schuh D8430		CHECKED <i>L Romi</i>	BY <i>G. Tran</i> Elizabeth Tran		CHECKED DON 8/17/04		
DATE PREPARED 5/24/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>PCD</i>		

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pump/Generating Plant,
Switchyard and Conveyance System To/From BRR
Pump/Generate Conveyance System - Q= 3,500 cfs

Tunnel/Tunnel

DISCHARGE1

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PumpGen_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Tunnel Outlet Features (Beyond Mult-Level Intake)					
		Assume ~100' head to valley invert and L= 4000'					
		Assume need to control flow from tunnel portal to bottom of reservoir during initial fill.					
		Earthwork					
	76	Excavation at outlet area for portal and channel	D8130	50,000	CY	\$15.00	\$750,000.00
	77	Excavation for pipe trench	D8130	307,000	CY	\$5.00	\$1,535,000.00
	78	Excavation for thrust block	D8130	1,500	CY	\$15.00	\$22,500.00
	79	Concrete for open channel	D8130	500	CY	\$400.00	\$200,000.00
	80	F & P reinforcement (160 lbs/CY)	D8130	83,000	LBS	\$1.00	\$83,000.00
	81	Furnish and handle cement (.282T/CY)	D8130	150	TONS	\$160.00	\$24,000.00
	82	Concrete for thrust block	D8130	1,000	CY	\$400.00	\$400,000.00
	83	F & P reinforcement (100 lbs/CY)	D8130	100,000	LBS	\$1.00	\$100,000.00
	84	Furnish and handle cement (.235T/CY)	D8130	240	TONS	\$160.00	\$38,400.00
	85	Furnish and place Zone 3 bedding for pipe	D8130	24,000	CY	\$40.00	\$960,000.00
	86	Backfill pipe with excavated material	D8130	237,000	CY	\$7.00	\$1,659,000.00
	87	Furnish and place zone 3 bedding for riprap	D8130	5,000	CY	\$40.00	\$200,000.00
	88	Furnish and place riprap	D8130	10,000	CY	\$35.00	\$350,000.00
	89	20' dia. Steel pipe L = 4000' t= 3/4 inches Wt/ft + 10% for couplings and connections	D8130	8,500,000	LBS	\$2.00	\$17,000,000.00
	90	Steel safety trashracks	D8410	80,000	LBS	\$4.00	\$320,000.00
	91	Steel Bulkhead	D8410	120,000	LBS	\$4.00	\$480,000.00
	92	Remove and salvage 20' dia. Steel pipe Assume diver-assisted removal in wet at a max depth = 100'. Assume removal of 90% of the pipe. Assume lift bags to raise pipe and barge-mounted crane to handle pipe at surface. Salvage at \$50/ton (quote), but salvage value is much less than the cost to remove and cut up pipe.	D8410	7,650,000	LBS	N/A	N/A
		Discharge 1 - Subtotal					\$272,037,100.00

QUANTITIES

PRICES

BY

Doug Stanton (D8130)

Rick Christensen (D8410)

CHECKED

DAB AMR

BY

Craig A. Grush

CHECKED

BOV 8/17/04

DATE PREPARED

4/27/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

Ded

**Priest Rapids Intake, Pump/Generating Plant, Switchyard
and Inflow Conveyance System
Q= 3,500 cfs**

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

Summary Sheet 1 of 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Estimate Worksheets Identify One Type of Intake, Pumping Plant and Discharge Line.					
		PUMPING PLANT PLUS DISCHARGE 1: TUNNEL/TUNNEL					
		Intake - Civil/Structural Subtotal					\$62,549,800.00 ✓
		Intake - Mechanical/Electrical Subtotal					\$16,266,190.00 ✓
		Plant - Civil/Structural Subtotal					\$74,727,300.00 ✓
		Plant - Mechanical Subtotal					\$162,681,500.00 ✓
		Plant - Electrical Subtotal					\$8,171,175.00 ✓
		Switchyard & Transmission Line Subtotal					\$29,730,000.00 ✓
		Discharge 1 - Subtotal					\$248,397,650.00 ✓
		Subtotal					\$602,523,615.00 ✓
		Mobilization +/- 5%					\$30,000,000.00 ✓
		Subtotal w/ mobilization					\$632,523,615.00 ✓
		Unlisted Items +/- 10%					\$67,476,385.00 ✓
		CONTRACT COST					\$700,000,000.00 ✓
		Contingencies +/- 25%					\$170,000,000.00 ✓
		FIELD COST					\$870,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	Craig A. Grush Elizabeth Tran		CHECKED	COV 8/17/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	DEB 8/17/04

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

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Intake- Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Structural Excavation and Backfill					
		Assume dam excavation is all common.					
		Assume top 5 feet of excavation is common and the remainder is rock					
		Assume stockpile and use for backfill or embankment.					
	7	Excavation of common materials for structures	D8140	458,600	CY	\$6.00	\$2,751,600.00
	8	Excavation of rock for structures (drill & shoot)	D8140	843,000	CY	\$15.00	\$12,645,000.00
	9	Furnish backfill for structures (assume local borrow)	D8140	43,300	CY	\$4.00	\$173,200.00
	10	Place backfill around structures	D8140	43,300	CY	Included above	
	11	Compact backfill around structures	D8140	43,300	CY	\$5.00	\$216,500.00
		Roads and Fencing					
	12	Gravel surfacing		2,270	TONS	\$20.00	\$45,400.00
		20 ft wide road right side of channel					
		12 ft wide road left side of channel					
	13	Safety fencing		4,750	LF	\$20.00	\$95,000.00
		8' chainlink fence					
		STRUCTURAL					
		Construct Gated Intake and Fishscreen Structure					
	14	Furnish, form, and place reinforced concrete (F _c =4ksi)	D8140	56,890	CY	\$350.00	\$19,911,500.00
	15	Furnish and place concrete reinforcement.	D8140	9,102,400	LBS	\$0.75	\$6,826,800.00
	16	Furnish and handle cement	D8140	16,050	TONS	\$110.00	\$1,765,500.00
		Construct Lined Intake Canal					
	17	Furnish, form, and place unreinforced concrete lining in excavated channel (F _c = 3 ksi)	D8140	2,640	CY	\$350.00	\$924,000.00
	18	Furnish and handle cement	D8140	740	TONS	\$140.00	\$103,600.00
		Construct Bypass Pipe					
	19	4 - 54" Dia. steel pipe for fish bypass. Mortar lined pipes		21,120	LF	\$330.00	\$6,969,600.00
	20	Bypass pipe common excavation		303,250	CY	\$5.00	\$1,516,250.00
	21	Bypass pipe rock excavation		159,500	CY	\$15.00	\$2,392,500.00
	22	Bypass pipe backfill		435,700	CY	\$7.00	\$3,049,900.00
	23	Bypass pipe soil cement bedding (100 psi)		14,590	CY	\$55.00	\$802,450.00
		Miscellaneous Metalwork					
		Listed under Intake - Mechanical Items					
		Intake - Civil/Structural Subtotal					\$62,549,800.00

QUANTITIES**PRICES**

BY Chou Cha	CHECKED David Gesundheit/Anne Pavol	BY <i>g</i> Craig A. Grush	CHECKED BOV 8/17/04
DATE PREPARED 4/19/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Doc</i>

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

Intake- Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
	1	Furnish and install steel stoplog guides and seats (upstream of radial gates)	D8410	22,000	LBS	\$6.00	\$132,000.00
	2	Furnish and install steel trashracks	D8410	170,000	LBS	\$4.00	\$680,000.00
	3	Furnish and install one trash rake, rails, supports (assume Atlas Polar DT8300 rake)	D8410	30,000	LBS	\$10.00	\$300,000.00
	4	Furnish and install one conveyor, steel	D8410	20,000	LBS	\$10.00	\$200,000.00
	5	Furnish and install steel fish screen guides, supports, embedded seats, and bypass walls	D8410	623,000	LBS	\$4.00	\$2,492,000.00
	6	Furnish and install fish screens, 10' W x 14' H panel 120 panels + 6 spares	D8410				
		Structural steel		177,000	LBS	\$4.00	\$708,000.00
		Stainless steel		177,000	LBS	\$15.00	\$2,655,000.00
	7	Furnish and install barrier panels above fish screens 10' W x 11' H panels, 120 panels + 6 spares	D8410				
		Structural steel		347,000	LBS	\$4.00	\$1,388,000.00
	8	Furnish and install adjustable baffle panels 10' W x 25' H panels, 120 panels + 6 spares	D8410				
		Structural steel		945,000	LBS	\$4.00	\$3,780,000.00
	9	Furnish and install fish screen cleaners with travel rail, 8 systems with 2 brush cleaner arms per system	D8410				
		a. Structural steel		64,000	LBS	\$4.00	\$256,000.00
		b. Stainless steel		4,000	LBS	\$20.00	\$80,000.00
		c. 2 Hp motors/gear reducers, with adj. speed controllers, and limit switches		8	UNITS	\$5,000.00	\$40,000.00
	10	Furnish and install water level measuring systems	D8410	17	UNITS	\$11,000.00	\$187,000.00
		Sheet Subtotal					\$12,898,000.00

QUANTITIES**PRICES**

BY R Christensen/B Sund	CHECKED <i>AMR</i>	BY <i>G</i> Craig A. Grush	CHECKED <i>BOV</i> BOV/8/17/04
DATE PREPARED 4/21/2004	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BOV</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:					
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 6,000 cfs			Yakima River Basin Water Storage Options					
			REGION		PN	PRICE LEVEL:		Appraisal
			FILE:					
Intake- Mechanical			C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary					
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		Mechanical (cont)						
	11	Furnish and install steel stoplog guides and seats (downstream of fish screens)	D8410	22,000	LBS	\$6.00	\$132,000.00	
	12	Furnish and install one set of steel stoplogs for the two different size bays with lifting beam	D8410	167,000	LBS	\$4.00	\$668,000.00	
	13	3' wide walkway, steel, safety grating along fish screens	D8410	33,000	LBS	\$7.00	\$231,000.00	
	14	Handrail along each side of fish screen walkway	D8410	2,560	LF	\$50.00	\$128,000.00	
		Radial Gates in Intake Structure						
		Furnish and install four 36.5-ft x 8.5-ft top seal radial gates and hoist equipment:	D8420					
	15	Gate (Weight/gate= 34,650 lbs)		138,600	LBS	\$8.00	\$1,108,800.00	
	16	Embedded metalwork (Weight/bay= 5,000 lbs)		20,000	LBS	\$5.00	\$100,000.00	
	17	Hoist operator (Weight/gate operator= 11,300 lbs)		45,200	LBS	\$20.00	\$904,000.00	
	18	Motor - 5 hp (One per gate)		4	EA	Included in operator \$		
		Sheet Subtotal					\$3,271,800.00	
QUANTITIES			PRICES					
BY R Christensen/B Sund (D8410) P. Hoffman (D8420)		CHECKED <i>AMR</i>	BY <i>G</i> Craig A. Grush		CHECKED <i>GOV</i> 8/17/04			
DATE PREPARED 5/12/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>BCD</i>			

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

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Appraisal

FILE:

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Revisions\Priest Rapids PP_6000 Rev 1.xls Summary

Intake- Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Service Equipment (F&I)	D8430				
	19	Distribution panelboard, outdoor type 480 volts, 3-phase with 225 ampere bus		1	EA	\$25,000.00	\$25,000.00
	20	Outdoor transformer load center 15 kVA, 1-phase, 480-240/120 volt		1	EA	\$11,000.00	\$11,000.00
		Combination Motor Starters	D8430				
	21	NEMA size 2 non-reversing contactor, 480-120 volt control transformer NEMA type 4 enclosure		6	EA	\$8,000.00	\$48,000.00
		Insulated Conductors (F&I)					
		600-volt, single-conductor, stranded copper					
	22	12 AWG		500	LF	\$0.60	\$300.00
	23	10 AWG		200	LF	\$0.70	\$140.00
	24	8 AWG		100	LF	\$1.00	\$100.00
		Conduit System (F&I)					
		Rigid steel conduit					
	25	1 inch		150	LF	\$15.00	\$2,250.00
		Lighting System (F&I)	D8430				
	26	High-pressure sodium, pole mounted, outdoor 70 watt, 120 volt		6	EA	\$1,600.00	\$9,600.00
		Intake - Mechanical/Electrical Subtotal					\$16,266,190.00

QUANTITIES

PRICES

BY Mike Schuh	CHECKED <i>L. Rom</i>	BY <i>G. Tran</i> Elizabeth Tran	CHECKED DOV 8/17/04
DATE PREPARED 5/6/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DOV</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:					
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 6,000 cfs Plant- Civil			Yakima River Basin Water Storage Options					
			REGION	PN	PRICE LEVEL:			Appraisal
			FILE:					C:\Documents and Settings\lvannotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		Access Road (9.75 miles of 2-lane access road):						
		Assume construct access road from SH24 to PP.						
		Assume place road along abandoned railroad alignment						
		Assume no major excavation or embankment sections.						
	1	Clear roadway alignment	D8140	45	AC	\$3,500.00	\$157,500.00	
	2	Furnish and place base course material (9-inch depth)	D8140	96,000	TONS	\$16.00	\$1,536,000.00	
	3	Furnish and place asphalt concrete (6-inch depth)	D8140	70,000	TONS	\$60.00	\$4,200,000.00	
	4	Furnish and install W-beam type guardrail	D8140	10,000	LF	\$25.00	\$250,000.00	
	5	Furnish and install miscellaneous pipe culverts Assume 36-inch-diameter, wt/ft= 35#/ft)	D8140	1,000	LF	\$200.00	\$200,000.00	
		Service Yard (6" asphalt concrete surface)						
	6	Strip and clear pumping plant site to 1 foot depth	D8120	15,300	CY	\$3.00	\$45,900.00	
	7	Common excavation to Service Yard El. 505.0	D8120	164,000	CY	\$5.00	\$820,000.00	
	8	Rock excavation to Service Yard El. 505.0	D8120	208,000	CY	\$15.00	\$3,120,000.00	
	9	Place and compact embankment for service yard	D8120	19,200	CY	\$8.00	\$153,600.00	
	10	Furnish and place base course material (6-inch)	D8120	10,000	TONS	\$20.00	\$200,000.00	
	11	Furnish and place asphalt concrete (6-inch)	D8120	11,000	TONS	\$80.00	\$880,000.00	
	12	Furnish and install 7-foot chain link fence for PP Yard	D8120	3,100	LF	\$20.00	\$62,000.00	
	13	Furnish and install 7-foot x 24-foot access gate	D8120	3	EA	\$3,500.00	\$10,500.00	
		Dewatering During Construction:						
		Assume no groundwater flows into excavation.						
		Structural Excavation and Backfill						
		Assume all common material excavated under site excavation for yard.						
		Assume stockpile rock for later use as riprap or rockfill.						
	14	Excavation of rock for structures (drill & shoot)	D8120	248,400	CY	\$15.00	\$3,726,000.00	
	15	Furnish backfill for structures (assume local borrow)	D8120	44,300	CY	\$4.00	\$177,200.00	
	16	Place backfill around structures	D8120	44,300	CY	Included above		
	17	Compact backfill around structures	D8120	44,300	CY	\$5.00	\$221,500.00	
	18	Rock Exc. for manifold pipe to edge of Service Yard	D8120	102,400	CY	\$15.00	\$1,536,000.00	
	19	Furnish, place, & compact backfill for manifold pipe trench(assu	D8120	83,200	CY	\$9.00	\$748,800.00	
	20	Furnish & place soil cement for manifold pipe trench	D8120	10,700	CY	\$55.00	\$588,500.00	
		Sheet Subtotal					\$18,633,500.00	
QUANTITIES			PRICES					
BY	Dick LaFond	CHECKED	BY			CHECKED		
	M.R. O'Shea	<i>M.R. O'Shea (0-8-20)</i>				<i>6/17/04</i>		
DATE PREPARED	4/19/04	PEER REVIEW	DATE PREPARED			PEER REVIEW		
			08/17/04			<i>DCD</i>		

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

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Appraisal

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Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

Plant- Structural

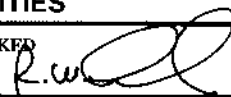
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Building Structure					
	21	Furnish, form, and place reinforced concrete	D8120	111,800	CY	\$350.00	\$39,130,000.00
	22	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	12,298,000	LBS	\$0.75	\$9,223,500.00
	23	Furnish and handle cement (.282T/CY)	D8120	31,530	TONS	\$110.00	\$3,468,300.00
	24	Furnish & install precast, prestressed double tees for roof 10LDT 32+2 = 10' wide & 32" deep - 80' Span	D8120	45	EA.	\$50,000.00	\$2,250,000.00
		Structural Steel					
	25	Furnish and install structural steel (painted): crane rails, baseplates	D8120	68,000	LBS	\$4.00	\$272,000.00
		Miscellaneous Metalwork					
	26	Furnish and install miscellaneous metalwork Includes gratings, hatches, ladders, guardrails, catwalk, and cable trays and supports	D8120	250,000	LBS	\$7.00	\$1,750,000.00
		Plant - Civil/Structural Subtotal					\$74,727,300.00 ✓

QUANTITIES

PRICES

BY M. R. O'Shea

CHECKED



BY



Craig A. Grush

CHECKED

600 6/17/04

DATE PREPARED

4/19/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW



ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

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


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Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

Plant - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Major Mechanical Equipment					
		Pump prices below telephone quote from Bob Rittase, Voith Hydro, 717-792-7206					
		1000 cfs two-stage spiral case pump, rated 1000 cfs at 1430 ft total dynamic head, overall efficiency more than 83% operating range 1030 to 1430 ft					
	1	Pumps		6	EA	\$9,000,000.00	\$54,000,000.00
	2	Motors		6	EA	\$4,500,000.00	\$27,000,000.00
		Spherical discharge valves, with operators, rated at 1500 ft working pressure and 12000 ft surge pressure, with operators		6	EA	\$4,500,000.00	\$27,000,000.00
	4	Installation supervision of 1000 cfs pumping unit		6	EA	\$1,500,000.00	\$9,000,000.00
		FURNISH-AND-INSTALL THE FOLLOWING:					
		Steel Manifold and Suction Tubes	D8420				
		Steel plate used for pipe fabrication: ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi					
		(All pipe sizes are inside diameters)					
	5	264" Dia., 4.8125" wall, L= 320 ft.		4,450,000	LBS	\$2.00	\$8,900,000.00
	6	264" Dia., 4.625" wall, L= 540 ft.		7,200,000	LBS	\$2.00	\$14,400,000.00
	7	248" Dia., 4.5" wall, L = 110ft.		1,350,000	LBS	\$2.00	\$2,700,000.00
	8	170" Dia., 1" wall, L= 845 ft.		1,550,000	LBS	\$2.00	\$3,100,000.00
	9	222" Dia., 4" wall, L= 105 ft.		1,020,000	LBS	\$2.00	\$2,040,000.00
	10	192" Dia., 3.5" wall, L= 90 ft.		660,000	LBS	\$2.00	\$1,320,000.00
	11	110" Dia., 2 " wall, L= 502 ft.		1,200,000	LBS	\$2.00	\$2,400,000.00
	12	157 Dia., 2.875" wall, L= 90 ft.		445,000	LBS	\$2.00	\$890,000.00
		Sheet Subtotal					\$152,750,000.00

QUANTITIES

PRICES

BY Richard Fehr Nathan Nakamoto	CHECKED	BY  Craig A. Grush	CHECKED  8/17/04
DATE PREPARED 5/6/04		DATE PREPARED 08/17/04	PEER REVIEW 

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

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Plant - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	13	CO2 High Pressure Fire Extinguishing System: 16 - 100# Storage Cylinders w/ control panel and appurtenances and 2,500 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	2	each	\$100,000.00	\$200,000.00
	14	Fire Suppression System: 12 Fire hose reels w/ 100 feet of hose 24 - Portable hand-held 20# extinguishers 13,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$225,000.00
	15	Unit Cooling Water System: 7 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 5,000 lbs. of type K copper tubing, valves & fittings 6,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$275,000.00
	16	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 4,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$60,000.00
	17	Compressed Air System: 2 - 100 cfm @ 125 psi rotary screw air compressors 1 - 250 gal. carbon steel air receiver 1 - 200 cfm air dryer 4,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$110,000.00
	18	Service Water System: 1 - Service water pump, 75 gpm @ 200 ft. of head 1 - Hydropneumatic Tank, 300 gal. 2,000 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$110,000.00
	19	Gravity Drainage System: 60 - Floor drains, cast iron 35,000 lbs. of cast iron hub & spigot, service weight soil pipe	D-8410	1	L.S.		\$350,000.00
		Sheet Subtotal					\$1,330,000.00

QUANTITIES

PRICES

BY

John Grass

CHECKED

AUG

BY

Craig A. Grush

CHECKED

BOV 8/17/04

DATE PREPARED

5/6/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

Pcd

ESTIMATE WORKSHEET

BUREAU OF RECONSTRUCTION			PROJECT:				
FEATURE:			Yakima River Basin Water Storage Options				
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 6,000 cfs			REGION		PN	PRICE LEVEL:	Appraisal
Plant - Mechanical			FILE:				
			C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	20	Plant Unwatering System: 2 - Vertical turbine type sump pump, 1000 gpm @ 50 ft hd 1 - Drainage jet type drainage pump 1,500 lbs. of type K copper tube, valves & fittings 4,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$200,000.00
	21	Domestic Water and Sanitary Waste System: 4 - Water Closets 2 - Urinal 4 - Lavatories & accessories 1 - Duplex Sewage Ejector 2,000 lbs. of cast iron hub & spigot service weight sewer pipe 800 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	22	100-Ton overhead crane, 72'-6" span	D8410	153,000	LBS	\$6.00	\$918,000.00
	23	200-Ton overhead crane, 72'-6" span, two required	D-8410	520,000	LBS	\$6.00	\$3,120,000.00
	24	Electric traction elevator overhead, geared, capacity = 3500 pounds, travel = 100 feet, landings = 6, speed = 200 ft/min.	D8410	1	unit	\$500,000.00	\$500,000.00
	25	Ultrasonic flowmeter, 4-path	D8410	1	meter	\$35,000.00	\$35,000.00
	26	Trashracks (steel) at pumping plant	D8410	106,000	LBS	\$4.00	\$424,000.00
	27	Stoplogs, lifting beam, seats and guides (steel) (assumes one bay of stoplogs and 6 bays of guides)	D8410	33,000	LBS	\$4.00	\$132,000.00
		Sheet Subtotal					\$5,429,000.00
QUANTITIES			PRICES				
BY R. Christensen, B. Sund A. Ritt, C. Berte, P. Schlien, J. Grass		CHECKED <i>Amr</i>	BY <i>g</i> Craig A. Grush		CHECKED BDV 8/17/04		
DATE PREPARED 5/6/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>BCD</i>		

ESTIMATE WORKSHEET

[illegible]

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock
Revisions\Priest Rapids PP_6000 Rev 1.xls|Summary

Plant-Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Plant Grounding System (F&I)	D8430				
	1	Ground rods, 10 ft, 3/4" dia., copper-clad Stranded bare-copper conductor		55	EA	\$180.00	\$9,900.00
	2	250 MCM		1,600	LF	\$5.50	\$8,800.00
	3	4/0 AWG		1,200	LF	\$4.00	\$4,800.00
	4	2/0 AWG		1,000	LF	\$3.50	\$3,500.00
	5	4 AWG		700	LF	\$2.50	\$1,750.00
		Motor Bus & Switchgear (F&I)	D8430				
	6	Main motor isolated-phase bus: 15 kV; 38,000 amperes; 3-phase; 60 hz. Self-cooled		600	LF	\$6,500.00	\$3,900,000.00
	7	Individual motor isolated-phase bus: 15 kV; 7,000 amperes; 3-phase; 60 hz. Self-cooled		300	LF	\$2,000.00	\$600,000.00
	8	Motor reduced-voltage, static starting system with 15 kV, SIP6 type unit circuit-breakers 7,000 amperes continuous current		6	EA	\$275,000	\$1,650,000.00
		Motor Control Equipment (F&I)	D8430				
	9	Duplex control switchboard for operation of 6 main pumping motors.		1	EA	\$250,000	\$250,000.00
		Motors Listed under Plant-Mechanical					
		Sheet Subtotal					\$6,428,750.00

QUANTITIES

PRICES

BY

Mike Schuh

CHECKED

L Rom

BY

G for:
Elizabeth Tranter

CHECKED

BBV 8/17/04

DATE PREPARED

5/6/04

PEER REVIEW

DATE PREPARED _____

08/17/04

PEER REVIEW

W
HCB

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Plant-Electrical

[illegible]

QUANTITIES

PRICES

BY

Mike Schuh

CHECKED

L Rom

BY

G for:
Elizabeth Tran

CHECKED

60W 8/17/04

DATE PREPARED

5/6/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

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ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

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Appraisal

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Plant-Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	17	Building Fire Detection and Alarm System (F&I)	D8430	1	LS		\$150,000.00
	18	Distribution Panelboards (F&I) 480 volts, 3-phase with 400 ampere bus	D8430	4	EA	\$80,000.00	\$320,000.00
	19	Motor Control Centers (F&I) 480 volts, 3-phase with 1200 ampere bus Six 20 inch wide sections	D8430	2	EA	\$150,000	\$300,000.00
		Insulated Conductors (F&I) 600-volt, single-conductor, stranded copper	D8430				
20	14 AWG			12,000	LF	\$0.50	\$6,000.00
21	12 AWG			15,500	LF	\$0.55	\$8,525.00
22	10 AWG			15,500	LF	\$0.70	\$10,850.00
23	6 AWG			3,000	LF	\$1.50	\$4,500.00
24	4 AWG			3,000	LF	\$1.75	\$5,250.00
25	1/0 AWG			2,000	LF	\$2.75	\$5,500.00
		600-volt multi-conductor control cable					
26	9 conductor 16 AWG			2,500	LF	\$1.25	\$3,125.00
27	12 conductor 16 AWG			3,500	LF	\$1.50	\$5,250.00
28	5 conductor 10 AWG			3,500	LF	\$1.75	\$6,125.00
		Conduit System (F&I) Rigid steel conduit	D8430				
29	1 inch			1,000	LF	\$14.00	\$14,000.00
30	2 inch			600	LF	\$22.00	\$13,200.00
31	2 1/2 inch			350	LF	\$30.00	\$10,500.00
32	3 inch			250	LF	\$42.00	\$10,500.00
		Plastic-coated rigid steel					
33	2 inch			400	LF	\$30.00	\$12,000.00
Plant - Electrical Subtotal							\$8,171,175.00

QUANTITIES

PRICES

BY Mike Schub	CHECKED <i>L Romi</i>	BY <i>G for:</i> Elizabeth Tran	CHECKED <i>END 8/17/04</i>
DATE PREPARED 5/6/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>ACK</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Priest Rapids Intake, Pumping Plant, Switchyard, and Inflow Conveyance System - Q= 6,000 cfs Switchyard			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_6000 Rev 1.xls Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL	D8120				
		Assume switchyard structures covered under unlisted items.					
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power transformer 873 MVA; 500-13.8kV, 1-phase	D8440	3	EA	\$7,000,000	\$21,000,000.00
	2	500-kV disconnect switches, 1200 amp, 3-phase	D8440	4	EA	\$125,000	\$500,000.00
	3	500-kV circuit breakers, 1200 amp, 3-phase	D8440	2	EA	\$1,115,000	\$2,230,000.00
	4	Construct Transmission Line	D8440	6	MILES	\$1,000,000	\$6,000,000.00
		Assume 6 miles of transmission line from Midway substation to the east					
		500-kV, steel towers, 2167 AWG conductor					
		Switchyard & Transmission Line Subtotal					\$29,730,000.00

QUANTITIES	
BY R. LaFond (D8120) L. Gamuciello (D8440)	CHECKED
DATE PREPARED 5/6/04	PEER REVIEW James R. Zeiger (D8440)

PRICES	
BY Elizabeth Tran	CHECKED Bob 8/17/04
DATE PREPARED 08/17/04	PEER REVIEW Bob

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

Tunnel/Tunnel Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

DISCHARGE1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Tunnel					
		Construct 34,850-ft long, 22.00-ft finished diameter, 25.00-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has three final support reaches.					
		32,150-ft long unreinforced concrete lined reach					
	1	Excavation (appr. 18 cy/lf)	D-8140	32,150	lf	\$2,400.00	\$77,160,000.00
	2	Furnish and place unreinforced concrete tunnel lining	D-8140	132,000	cy	\$350.00	\$46,200,000.00
	3	Cementitious materials for concrete tunnel lining	D-8140	37,200	tons	\$100.00	\$3,720,000.00
	4	Furnish & install 1-in dia, 10-ft long rock bolts	D-8140	266,000	lin ft	\$50.00	\$13,300,000.00
		1,000-ft long reinforced concrete lined reach					
	5	Excavation (appr. 18 cy/lf)	D-8140	1,000	lf	\$3,000.00	\$3,000,000.00
	6	Furnish and place reinforced concrete tunnel lining	D-8140	4,100	cy	\$350.00	\$1,435,000.00
	7	Cementitious materials for concrete tunnel lining	D-8140	1,160	tons	\$120.00	\$139,200.00
	8	Furnish and install concrete reinforcement	D-8140	64,400	lbs	\$1.00	\$64,400.00
	9	Furnish and install structural steel tunnel supports	D-8140	738,000	lbs	\$4.00	\$2,952,000.00
		1,700-ft long steel lined portal reach					
	10	Excavation (appr. 18 cy/lf)	D-8140	1,700	lf	\$3,000.00	\$5,100,000.00
		Steel Tunnel Liner:					
		ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi					
	10a	264" Dia., 4.625" wall, L= 1700 ft., 13,281 lbs/ft	D-8420	22,577,700	LBS	\$2.00	\$45,155,400.00
	11	Furnish and place backfill concrete	D-8140	6,970	cy	\$300.00	\$2,091,000.00
	12	Cementitious materials for backfill concrete	D-8140	1,970	tons	\$130.00	\$256,100.00
	13	Furnish & install 1-in dia, 10-ft long rock bolts	D-8140	9,800	lin ft	\$60.00	\$588,000.00
	14	Furnish and install structural steel tunnel supports	D-8140	738,400	lbs	\$4.00	\$2,953,600.00
		Sheet Subtotal					\$204,114,700.00

QUANTITIES

PRICES

BY	Bill Thompson (D8140) Rick Frisz (D8420)	CHECKED	KA (DEMO)	BY	G For: Craig A. Grush	CHECKED	BD 8/17/04
DATE PREPARED	4/19/04	PEER REVIEW		DATE PREPARED	08/17/04	PEER REVIEW	DeB

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

Tunnel/Tunnel Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

DISCHARGE1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Surge Shaft					
		Construct 1506-ft deep, 22.0-ft finished diameter, 24.34-ft minimum bore diameter, shaft in rock. Shaft will be excavated by raise bore and drill down method. Water problems will be minimal. Shaft has two final support reaches.					
		1,200-ft deep unreinforced concrete lined reach					
	15	Excavation (appr. 17 cy/lf)	D-8140	1,200	lf	\$6,000.00	\$7,200,000.00
	16	Furnish and place unreinforced concrete shaft lining	D-8140	3,800	cy	\$350.00	\$1,330,000.00
	17	Cementitious materials for concrete shaft lining	D-8140	1,070	tons	\$130.00	\$139,100.00
	18	Furnish & install 5/8-in dia, 6-ft long rock bolts	D-8140	63,100	lin ft	\$50.00	\$3,155,000.00
		300-ft long reinforced concrete lined shaft top reach					
	19	Excavation (appr. 17 cy/lf)	D-8140	300	lf	\$6,000.00	\$1,800,000.00
	20	Furnish and place reinforced concrete shaft lining	D-8140	945	cy	\$400.00	\$378,000.00
	21	Cementitious materials for concrete shaft lining	D-8140	265	tons	\$160.00	\$42,400.00
	22	Furnish and install concrete reinforcement	D-8140	15,700	lin ft	\$1.00	\$15,700.00
	23	Furnish & install 5/8-in dia, 6-ft long rock bolts	D-8140	15,600	lin ft	\$50.00	\$780,000.00
	24	Furnish and install chain link protection	D-8140	13,000	sq yd	\$20.00	\$260,000.00
		Sheet Subtotal					\$15,100,200.00

QUANTITIES

PRICES

BY Bill Thompson	CHECKED <i>KA</i>	BY <i>C. For</i> Craig A. Grush	CHECKED <i>001 8/19/04</i>
DATE PREPARED 5/5/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Rep</i>

ESTIMATE WORKSHEET

FEATURE:

Priest Rapids Intake, Pumping Plant, Switchyard, and
Inflow Conveyance System - Q= 6,000 cfs

Tunnel/Tunnel Option

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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Revisions\Priest Rapids PP_6000 Rev 1.xls\Summary

DISCHARGE1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		For Tunnel only inlet - For 6000 cfs from Priest Rapids					
		Assume ~100' head to valley invert and L~ 4000'					
		Quantities for the 6000 cfs flow are scaled up from the 3500 cfs option.					
		Earthwork					
		Assume 110% of the 3500 cfs option unless otherwise shown					
	25	Excavation at outlet area for portal and channel	D8130	55,000	CY	\$15.00	\$825,000.00
	26	Excavation for pipe trench	D8130	337,700	CY	\$5.00	\$1,688,500.00
	27	Excavation for thrust block	D8130	1,650	CY	\$15.00	\$24,750.00
	28	Furnish and place Zone 3 bedding for pipe	D8130	26,400	CY	\$40.00	\$1,056,000.00
	29	Backfill pipe with excavated material	D8130	260,700	CY	\$7.00	\$1,824,900.00
	30	Furnish and place zone 3 bedding for riprap (120%)	D8130	6,000	CY	\$40.00	\$240,000.00
	31	Furnish and place riprap (120%)	D8130	12,000	CY	\$35.00	\$420,000.00
		Concrete					
	32	Concrete for open channel (150%)	D8130	750	CY	\$400.00	\$300,000.00
	33	F & P reinforcement (160 lbs/CY)	D8130	120,000	LBS	\$1.00	\$120,000.00
	34	Furnish and handle cement (.282T/CY)	D8130	210	TONS	\$160.00	\$33,600.00
	35	Concrete for thrust block (170%)	D8130	1,700	CY	\$400.00	\$680,000.00
	36	F & P reinforcement (100 lbs/CY)	D8130	170,000	LBS	\$1.00	\$170,000.00
	37	Furnish and handle cement (.235T/CY)	D8130	400	TONS	\$160.00	\$64,000.00
		Steel Pipe					
	38	24" dia. Steel pipe L = 4000' t= 3/4 inches Wt/ft + 10% for couplings and connections (wt/ft = 2315 lbs/ft)	D8130	10,186,000	LBS	\$2.00	\$20,372,000.00
	39	Furnish and install steel safety trashracks	D8410	135,000	LBS	\$4.00	\$540,000.00
	40	Furnish and install steel bulkhead	D8410	206,000	LBS	\$4.00	\$824,000.00
	41	Remove and salvage 24" dia. Steel pipe Assume diver-assisted removal in wet at a max depth = 100'. Assume removal of 90% of the pipe. Assume lift bags to raise pipe and barge-mounted crane to handle pipe at surface. Salvage at \$50/ton (quote), but salvage value is much less than the cost to remove and cut up pipe.	D8410	9,167,400	LBS	N/A	N/A
		Discharge 1 - Subtotal					\$248,397,650.00

QUANTITIES

PRICES

BY Doug Stanton (D8130) <i>DS</i>	CHECKED <i>SAAR</i> <i>Mar</i>	BY <i>G for</i> <i>Doug A. Grush</i>	CHECKED <i>601 8/17/04</i>
DATE PREPARED 5/7/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>scd</i>

Black Rock Dam and Reservoir
Large Reservoir
Active Storage= 1.3 MAF

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Summary Sheet 1 of 3

WOID = YAKEN

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Estimate Worksheets Identify Three Dam Types					
		Dam Type 1: Concrete-Faced Rockfill Dam					
		Dam Type 2: Central-Core Rockfill Dam					
		Dam Type 3: Roller Compacted Concrete Dam					
		DAM TYPE 1: CONCRETE-FACED ROCKFILL					
		Includes foundation treatment, dam structure, river outlet works, and relocation of State Highway 24.					
		Dam1 Subtotal					\$774,496,000.00 ✓
		River Outlet Works (ROW1) Subtotal					\$83,494,115.00 ✓
		Relocation of State Highway 24 (SH24) Subtotal					\$57,320,000.00 /
		Subtotal					\$915,310,115.00 ✓
		Mobilization 5% (+/-)					\$46,000,000.00 ✓
		Subtotal w/ mobilization					\$961,310,115.00 /
		Unlisted Items 10% (+/-)					\$88,689,885.00 /
		DAM TYPE 1: CONTRACT COST					\$1,050,000,000.00 ✓
		Contingencies 25% (+/-)					\$250,000,000.00 ✓
		DAM TYPE 1: FIELD COST					\$1,300,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	D. Donaldson		CHECKED	BOV 8/17/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	BOV 8/17/04

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Summary Sheet 3 of 3

WOID = YAKEN

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		DAM TYPE 3: ROLLER COMPACTED CONCRETE					
		Includes foundation treatment, dam structure, river outlet works, and relocation of State Highway 24.					
		Dam3 Subtotal					\$1,239,036,300.00 /
		River Outlet Works (ROW2) Subtotal					\$23,384,515.00 /
		Relocation of State Highway 24 (SH24) Subtotal					\$57,320,000.00 /
		Subtotal					\$1,319,740,815.00 /
		Mobilization 5% (+/-)					\$66,000,000.00 /
		Subtotal w/ mobilization					\$1,385,740,815.00 /
		Unlisted Items 10% (+/-)					\$114,259,185.00 /
		DAM TYPE 3: CONTRACT COST					\$1,500,000,000.00 /
		Contingencies 25% (+/-)					\$400,000,000.00 /
		DAM TYPE 3: FIELD COST					\$1,900,000,000.00 /
QUANTITIES			PRICES				
BY	CHECKED		BY	D. Donaldson <i>DD</i>		CHECKED	<i>DD</i> 8/17/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	<i>DD</i> 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir
 Large Reservoir - Active Storage= 1.3 MAF
 Dam Type 1: Concrete-Faced Rockfill Dam
 Dam 1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK					
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are part of unlisted items					
		DIVERSION & DEWATERING					
		Assume groundwater is below excavation					
		Assume natural stream beds in area are dry					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse					
		Assume rock material stockpiled for reuse					
		Stockpiles will be upstream, within 1/2 mile of dam					
	1	Excavation, stripping, of dam foundation Assume depth of stripping 12 inches or less Assume stripping will be stockpiled for topsoil use	D8312	360,000	CY	\$2.00	\$720,000.00
	2	Excavation, common, for dam foundation Assume about 35% of volume requires ripping Assume fine-grained and coarse-grained materials will be separately stockpiled	D8312	26,640,000	CY	\$3.00	\$79,920,000.00
	3	Excavation, rock, for dam foundation Assume drill and blast in random locations	D8312	2,000	CY	\$45.00	\$90,000.00
		FOUNDATION TREATMENT					
		Includes misc. foundation treatment, fault zone treatment, consolidation grouting, and curtain grouting					
		Miscellaneous Foundation Areas					
		Applied in areas of poor quality rock					
	4	Slush grouting of foundation surface Over assumed 10% of area between w/s toe and axis	D8312	165,000	SF	\$2.00	\$330,000.00
	5	Dental concrete	D8312	2,000	CY	\$150.00	\$300,000.00
	6	Furnish/place zone 2 sand filter on foundation Over assumed 10% of area between w/s toe and axis Assume a 3-ft thickness	D8312	40,000	CY	\$28.00	\$1,120,000.00
	7	Furnish/place zone 3 gravel drain on foundation Over the zone 2 filter in a 3-ft thickness	D8312	40,000	CY	\$25.00	\$1,000,000.00
		Dam1 Subtotal					\$83,480,000.00

QUANTITIES

PRICES

BY

Will Gonzales

CHECKED

Bill Engemoen

BY

D. Donaldson

CHECKED

BOV 8/17/04

DATE PREPARED

4/12/2004

PEER REVIEW

Bill Engemoen

DATE PREPARED

08/17/04

PEER REVIEW

KAB 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 1: Concrete-Faced Rockfill Dam

Dam1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

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FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Treatment of south abutment fault area					
	8	Extra rock excavation for fault treatment <i>Assume south abutment is fractured</i> <i>Assume excavate with hydraulic excavator</i>	D8312	150,000	CY	\$13.00	\$1,950,000.00
	9	Dental concrete for fault treatment	D8312	5,000	CY	\$140.00	\$700,000.00
	10	Furnish/place zone 2 sand filter downstream of plinth <i>Assume a 3-ft thickness, 500' by 1000' area</i> <i>Assume same source as listed under embankment</i>	D8312	55,000	CY	\$28.00	\$1,540,000.00
	11	Furnish/place zone 3 gravel drain d/s of plinth <i>Assume 3-ft thickness, over zone 2 filter</i>	D8312	55,000	CY	\$25.00	\$1,375,000.00
		Consolidation Grouting of Foundation <i>Generally limited to area beneath plinth</i>					
	12	Setups for drilling grout holes <i>Assume 2-inch dia. drilled on 7.5-foot centers</i>	D8312	4,400	EA	\$75.00	\$330,000.00
	13	Drill grout holes <i>Assume 2-inch dia. w/length= 30 feet</i>	D8312	132,000	LF	\$15.00	\$1,980,000.00
	14	Hookups to grout holes	D8312	4,400	EA	\$60.00	\$264,000.00
	15	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	200,000	CF	\$7.00	\$1,400,000.00
	16	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	200,000	BAGS	\$8.00	\$1,600,000.00
		Curtain Grouting of Foundation <i>Two-row curtain beneath plinth</i>					
	17	Setups for drilling grout holes <i>Assume 2-rows of 2-inch dia. on 10-ft centers</i>	D8312	1,400	EA	\$100.00	\$140,000.00
	18	Drill grout holes <i>Assume 2-inch dia. w/length from 60 to 250 feet</i>	D8312	275,000	LF	\$15.00	\$4,125,000.00
	19	Hookups to grout holes	D8312	1,400	EA	\$75.00	\$105,000.00
	20	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	550,000	CF	\$7.00	\$3,850,000.00
	21	Furnish and handle cement for pressure grouting	D8312	550,000	BAGS	\$8.00	\$4,400,000.00
		Dam1 Subtotal					\$23,759,000.00

QUANTITIES

PRICES

BY Will Gonzales	CHECKED Bill Engemoen	BY D. Donaldson <i>DD</i>	CHECKED BOW 8/17/04
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04	PEER REVIEW Paw 8/17/04

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir			Yakima River Basin Water Storage Options				
Large Reservoir - Active Storage= 1.3 MAF			REGION		PN	PRICE LEVEL:	Appraisal
Dam Type 1: Concrete-Faced Rockfill Dam			FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary				
Dam1 - Civil/Structural							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		<i>Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation</i>					
	22	Furnish and place zone 1 upstream blanket <i>Consists of loess stockpiled from required exc within 1/2 mile of dam</i>	D8312	900,000	CY	\$6.00	\$5,400,000.00
	23	Furnish and place zone 2 filter <i>Sand/gravel material processed commercially or developed onsite</i> <i>If commercial, assume 17 mile one-way haul</i> <i>Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,420,000	CY	\$25.00	\$35,500,000.00
	24	Furnish and place zone 3 drain <i>Gravel/cobble material processed commercially or developed onsite</i> <i>If commercial, assume 17 mile one-way haul</i> <i>Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,420,000	CY	\$23.00	\$32,660,000.00
	25	Furnish and place zone 4 rockfill <i>Developed from basalt ridges surrounding reservoir</i> <i>Assume average 1-mile haul to dam</i> <i>Rock sizes up to 3-foot</i> <i>Compacted in 3-ft layers by vibratory steel drum</i>	D8312	64,500,000	CY	\$6.50	\$419,250,000.00
	26	Furnish and place zone 5 coarse grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam</i> <i>Generally consists of gravelly soils</i> <i>Compacted in 2-ft layers by vibratory steel drum</i>	D8312	14,800,000	CY	\$4.00	\$59,200,000.00
	27	Furnish and place zone 6 fine grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam</i> <i>Generally consists of sands/silts/clays</i> <i>Compacted to 9-inch layers by tamping rollers</i>	D8312	6,900,000	CY	\$4.50	\$31,050,000.00
		Dam1 Subtotal					\$583,060,000.00
QUANTITIES			PRICES				
BY Will Gonzales		CHECKED Bill Engemoen	BY D. Donaldson		CHECKED BOV 8/17/04		
DATE PREPARED 4/12/2004		PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04		PEER REVIEW BOV 8/17/04		

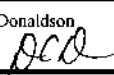

ESTIMATE WORKSHEET

FEATURE: Black Rock Dam and Reservoir Large Reservoir - Active Storage= 1.3 MAF Dam Type 1: Concrete-Faced Rockfill Dam Dam1 - Civil/Structural			PROJECT: Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL: Appraisal		
			FILE: C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CONCRETE FACE & PLINTH CONSTRUCTION					
		Plinth					
		Typical thickness will be 1.5 feet					
		Width will range from 10 to 50 feet					
		Grouted anchors may be needed in poor rock areas					
	28	Furnish and place reinforced concrete in plinth	D8312	11,000	CY	\$350.00	\$3,850,000.00
	29	Furnish and place concrete reinforcement (100#/CY)	D8312	1,100,000	LBS	\$0.80	\$880,000.00
	30	Furnish and handle cement for concrete (.282T/CY)	D8312	3,100	TONS	\$120.00	\$372,000.00
	31	Furnish and install grouted anchors Assume 1-inch diameter rebar grouted into rock Assume 15-foot lengths	D8312	300,000	LF	\$15.00	\$4,500,000.00
		Concrete Deck					
		Will vary in thickness from 1 to 2 feet					
		Adjacent panels will have waterstops and dowels					
	32	Furnish and place reinforced concrete in deck	D8312	185,000	CY	\$300.00	\$55,500,000.00
	33	Furnish and place concrete reinforcement (100#/CY)	D8312	18,500,000	LBS	\$0.75	\$13,875,000.00
	34	Furnish and handle cement for concrete (.282T/CY)	D8312	52,200	TONS	\$100.00	\$5,220,000.00
		MISCELLANEOUS					
		Instrumentation					
		Assume part of unlisted items					
		Toe Drains					
		Assume part of unlisted items					
		Site cleanup and relandscaping					
		Assume part of unlisted items					
		Dam1 Subtotal					\$84,197,000.00
QUANTITIES			PRICES				
BY Will Gonzales		CHECKED Bill Engemoen		BY D. Donaldson <i>DED</i>		CHECKED BAV 8/17/04	
DATE PREPARED 4/12/2004		PEER REVIEW Bill Engemoen		DATE PREPARED 08/17/04		PEER REVIEW <i>BAV 8/17/04</i>	

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir Large Reservoir - Active Storage= 1.3 MAF Dam Type 2: Central -Core Rockfill Dam Dam2 - Civil/Structural			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK					
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are part of unlisted items					
		DIVERSION & DEWATERING					
		Assume groundwater is below excavation					
		Assume natural stream beds in area are dry					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse					
		Assume rock material stockpiled for reuse					
		Stockpiles will be upstream, within 1/2 mile of dam					
	1	Excavation, stripping, of dam foundation Assume depth of stripping 12 inches or less Assume stripping will be stockpiled for topsoil use	D8312	370,000	CY	\$2.00	\$740,000.00
	2	Excavation, common, for dam foundation Assume about 35% of volume requires ripping Assume fine-grained and coarse-grained materials will be separately stockpiled	D8312	27,130,000	CY	\$3.00	\$81,390,000.00
	3	Excavation, rock, for dam foundation Assume drill and blast in random locations	D8312	5,000	CY	\$32.00	\$160,000.00
		FOUNDATION TREATMENT					
		Includes misc. foundation treatment, fault zone treatment, consolidation grouting, and curtain grouting					
		Miscellaneous Foundation Areas					
		Applied in areas of poor quality rock					
	4	Slush grouting of foundation surface Over assumed 10% of area beneath zone 1	D8312	165,000	SF	\$2.00	\$330,000.00
	5	Dental concrete	D8312	5,000	CY	\$150.00	\$750,000.00
	6	Furnish/place zone 2 sand filter on foundation Over 10% of area between zone 1 and d/s toe Assume a 3-ft thickness	D8312	40,000	CY	\$28.00	\$1,120,000.00
	7	Furnish/place zone 3 gravel drain on foundation Over the zone 2 filter in a 3-ft thickness	D8312	40,000	CY	\$25.00	\$1,000,000.00
		Dam 2 Subtotal					\$85,490,000.00
QUANTITIES			PRICES				
BY Will Gonzales		CHECKED Bill Engemoen	BY D. Donaldson <i>DD</i>		CHECKED <i>BOV 6/17/04</i>		
DATE PREPARED 4/12/2004		PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04		PEER REVIEW <i>BOV 8/17/04</i>		

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir			Yakima River Basin Water Storage Options				
Large Reservoir - Active Storage= 1.3 MAF							
Dam Type 2: Central -Core Rockfill Dam							
Dam2 - Civil/Structural			REGION PN PRICE LEVEL: Appraisal FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Treatment of south abutment fault area					
	8	Extra rock excavation for fault treatment <i>Assume south abutment is fractured</i> <i>Assume excavate with hydraulic excavator</i>	D8312	150,000	CY	\$20.00	\$3,000,000.00
	9	Dental concrete for fault treatment	D8312	5,000	CY	\$140.00	\$700,000.00
	10	Furnish/place zone 2 sand filter downstream of zone 1 <i>Assume a 3-ft thickness, 500' by 1000' area</i> <i>Assume same source as listed under emb.</i>	D8312	55,000	CY	\$28.00	\$1,540,000.00
	11	Furnish/place zone 3 gravel drain d/s of zone 1 <i>Assume 3-ft thickness, over zone 2 filter</i>	D8312	55,000	CY	\$25.00	\$1,375,000.00
		Consolidation Grouting of Foundation <i>Generally limited to area beneath zone 1</i>					
	12	Setups for drilling grout holes <i>Assume 2-inch dia. drilled on 10-foot centers</i>	D8312	6,000	EA	\$75.00	\$450,000.00
	13	Drill grout holes <i>Assume 2-inch dia. w/length= 30 feet</i>	D8312	180,000	LF	\$15.00	\$2,700,000.00
	14	Hookups to grout holes	D8312	6,000	EA	\$60.00	\$360,000.00
	15	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	270,000	CF	\$7.00	\$1,890,000.00
	16	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	270,000	BAGS	\$8.00	\$2,160,000.00
		Curtain Grouting of Foundation <i>Two-row curtain beneath zone 1</i>					
	17	Setups for drilling grout holes <i>Assume 2-rows of 2-inch dia. on 10-ft centers</i>	D8312	1,400	EA	\$100.00	\$140,000.00
	18	Drill grout holes <i>Assume 2-inch dia. w/length from 60 to 250 feet</i>	D8312	275,000	LF	\$15.00	\$4,125,000.00
	19	Hookups to grout holes	D8312	1,400	EA	\$75.00	\$105,000.00
	20	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	550,000	CF	\$7.00	\$3,850,000.00
	21	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	550,000	BAGS	\$8.00	\$4,400,000.00
		Dam 2 Subtotal					\$26,795,000.00
QUANTITIES			PRICES				
BY	CHECKED	BY	D. Donaldson		CHECKED		
Will Gonzales	Bill Engemoen					BOV 8/17/04	
DATE PREPARED	PEER REVIEW	DATE PREPARED			PEER REVIEW		
4/12/2004	Bill Engemoen		08/17/04				

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 2: Central -Core Rockfill Dam

Dam2 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		<i>Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation</i>					
	22	Furnish and place zone 1 core <i>Acquired from source 6 miles from dam Compacted to 6-inch lifts by tamping roller</i>	D8312	9,000,000	CY	\$8.50	\$76,500,000.00
	23	Furnish and place zone 2 filter <i>Sand/gravel material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,390,000	CY	\$25.00	\$34,750,000.00
	24	Furnish and place zone 3 drain <i>Gravel/cobble material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,390,000	CY	\$23.00	\$31,970,000.00
	25	Furnish and place zone 4 rockfill <i>Developed from basalt ridges surrounding reservoir Assume average 1-mile haul to dam Rock sizes up to 3-foot Compacted in 3-ft layers by vibratory steel drum</i>	D8312	58,700,000	CY	\$6.50	\$381,550,000.00
	26	Furnish and place zone 5 coarse grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of gravelly soils Compacted in 2-ft layers by vibratory steel drum</i>	D8312	15,000,000	CY	\$4.00	\$60,000,000.00
	27	Furnish and place zone 6 fine grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of sands/silts/clays Compacted to 9-inch layers by tamping rollers</i>	D8312	8,050,000	CY	\$4.50	\$36,225,000.00
		Dam 2 Subtotal					\$620,995,000.00

QUANTITIES**PRICES**

BY Will Gonzales	CHECKED Bill Engemoen	BY D. Donaldson <i>DCD</i>	CHECKED <i>BA 8/17/04</i>
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04	PEER REVIEW <i>BA 8/17/04</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		General Sitework					
		Clear and grub reservoir area (not required)					
		Roads, haul roads, instrumentation, site cleanup and relandscaping included in unlisted items					
		Diversion/Dewatering during Construction					
		Assume groundwater is below excavation.					
		Assume natural stream beds in area are dry.					
		Foundation Excavation and Backfill					
		Strip topsoil and stockpile for reuse					
		Assume stockpile common material for backfill					
		Assume stockpile rock material for riprap and erosion protection					
		Assume drill and shoot rock for tunnels in ROW					
		foundation excavation					
		Materials for RCC					
		Assume RCC plant set up at dam site and materials trucked to the site					
		Assume concrete sand and aggregates come from Columbia or Yakima river basins and have a haul distance of 17-18 miles ave.					
		Assume cement shipped by rail to redi-mix plants that are 20 miles ave. distance from site.					
		Dam excavation and backfill	D8130				
	1	Strip topsoil and stockpile (1ft. Thick)		135,000	CY	\$2.00	\$270,000.00
	2	Excavate common material for dam foundation		10,500,000	CY	\$3.50	\$36,750,000.00
	3	Excavate rock for dam foundation		105,000	CY	\$13.00	\$1,365,000.00
		Assume ~ 1% of common excavation					
	4	Excavate rock for OW on right abutment		5,300	CY	\$32.00	\$169,600.00
	5	Backfill with common material from excavation		4,300,000	CY	\$3.50	\$15,050,000.00
		Foundation Treatment - Exc. And concrete treatment	D8130				
	6	Extra rock excavation for fault treatment		75,000	CY	\$13.00	\$975,000.00
		Assume south abutment is fractured					
		Assume excavate with hydraulic excavator					
	7	Dental concrete for fault treatment		2,500	CY	\$150.00	\$375,000.00
	8	Dental concrete for general foundation treatment		10,000	CY	\$130.00	\$1,300,000.00
	9	Furnish and handle cement (.282T/CY)		3,500	TONS	\$120.00	\$420,000.00
		Dam 3 Subtotal					\$56,674,600.00
QUANTITIES			PRICES				
BY	Doug Stanton <i>DS</i>	CHECKED	D. Donaldson <i>DD</i>	BY	D. Donaldson	CHECKED	SDV 8/17/04
DATE PREPARED	4/24/04	PEER REVIEW		DATE PREPARED	08/17/04	PEER REVIEW	Las 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal




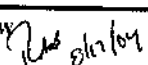
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Foundation Treatment - Consolidation grouting	D8130				
	10	Setups for drilling grout holes Assume 2-inch dia. drilled on 10-foot centers		21,800	EA	\$50.00	\$1,090,000.00
	11	Drill grout holes - 2-in. dia @ 30 ft long		654,000	LF	\$15.00	\$9,810,000.00
	12	Hookups to grout holes		21,800	EA	\$35.00	\$763,000.00
	13	Pressure grout Assume grouting process only minus cement Assume 2 CF per 1 LF of hole		1,308,000	CF	\$6.50	\$8,502,000.00
	14	Furnish and handle cement for pressure grouting Assume 1 bag per CF		1,308,000	BAGS	\$7.00	\$9,156,000.00
		Foundation Treatment - Grout Curtain thru gallery	D8130				
	15	Setups for drilling grout holes Assume 2-inch dia. Holes on 10-foot centers		675	EA	\$100.00	\$67,500.00
	16	Drill grout holes Assume 2-inch dia. w/depth ~55% ave H		170,000	LF	\$15.00	\$2,550,000.00
	17	Hookups to grout holes		675	EA	\$100.00	\$67,500.00
	18	Pressure grout Assume grouting process only minus cement Assume 2 CF per 1 LF of hole		340,000	CF	\$7.00	\$2,380,000.00
	19	Furnish and handle cement for pressure grouting Assume 1 bag per CF		340,000	BAGS	\$8.00	\$2,720,000.00
	20	F&I 4-inch dia. steel pipe nipples (assume 4'/drain)		2,700	LF	\$60.00	\$162,000.00
		Leveling Concrete for Foundation	D8130				
	21	Assume 6 sack mix, 3-foot thick over footprint		267,000	CY	\$200.00	\$53,400,000.00
	22	Furnish and handle cement (.282T/CY)		75,000	TONS	\$100.00	\$7,500,000.00
		Drill foundation drains from gallery	D8130				
	23	Setups (assume 10-ft centers)		700	EA	\$100.00	\$70,000.00
	24	Drill holes Assume 4-inch dia. w/length= 33% dam height.		175,000	LF	\$15.00	\$2,625,000.00
		Drill formed drains in dam body along U/S face	D8130				
		Assume 10-ft ctrs and 6-inch dia.					
	25	Lower gallery - Setups		440	EA	\$100.00	\$44,000.00
	26	Lower gallery - Holes drilled from gallery upward		94,500	LF	\$15.00	\$1,417,500.00
	27	Upper gallery - Setups		670	EA	\$100.00	\$67,000.00
	28	Upper gallery - holes drilled from dam crest to gallery		142,500	LF	\$15.00	\$2,137,500.00
		Dam 3 Subtotal					\$104,529,000.00

QUANTITIES

PRICES

BY Doug Stanton 	CHECKED 	BY D. Donaldson 	CHECKED Bor 8/17/04
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW 

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\lvannote\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Suturnary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct RCC Dam	D8130				
		Assume 275 lb/CY cementitious material					
		Assume 40% fly ash and 60% cement					
		Assume aggregate processed and hauled 15-20 miles					
		Assume cement hauled 20-25 miles					
	29	Construct RCC test section		4,100	CY	\$140.00	\$574,000.00
		Estimated dimensions = 100' x 35' x 30'					
		Assume convent. Conc. Facing elements					
		Assume incorporated into thrust block for stilling basin and control house					
		Includes gallery forming, waterstops, Contraction joint, facing elements, bonding mortar (no grouting)					
	30	Construct RCC Dam (Complete in Place)		22,018,000	CY	\$28.00	\$616,504,000.00
	30A	Furnish and handle cement (.138T/CY)		3,027,500	TONS	\$90.00	\$272,475,000.00
	31	Bonding Mortar (Assume 1/2-inch thick/lift on all lifts)		975,000	CY	\$70.00	\$68,250,000.00
		Cast-in-place Conventional Concrete	D8130				
	32	Facing elements - slipformed on U/S face		200,000	CY	\$100.00	\$20,000,000.00
	33	Facing elements - slabs on D/S face		244,000	CY	\$100.00	\$24,400,000.00
	34	Furnish and handle cement (.282T/CY)		125,200	TONS	\$100.00	\$12,520,000.00
	35	FRP Reinforced concrete dam crest		11,200	CY	\$250.00	\$2,800,000.00
	36	Assume 1.5 foot thick (160 lbs/CY)		1,800,000	LBS	\$0.80	\$1,440,000.00
	37	Furnish and handle cement (.282T/CY)		3,100	TONS	\$120.00	\$372,000.00
	38	FRP Reinforced concrete parapets on dam crest		2,600	CY	\$400.00	\$1,040,000.00
		Estimated 6,700 on both u/s and d/s sides					
	39	F & P reinforcement (160 lbs/CY)		416,000	LBS	\$0.80	\$332,800.00
	40	Furnish and handle cement (.282T/CY)		750	TONS	\$120.00	\$90,000.00
		Dam 3 Subtotal					\$1,020,797,800.00

QUANTITIES

PRICES

BY Dong Stanton	CHECKED <i>[Signature]</i>	BY D. Donaldson	CHECKED <i>[Signature]</i>
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>[Signature]</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct RCC Dam (continued)	D8130				
	41	Form lower drain/grout gallery/adits within RCC section Assume 6-ft wide x 10-ft high across base of dam Assume Symons Panel system for 12" RCC lifts		7,000	LF	\$50.00	\$350,000.00
	42	Form upper drainage gallery/adits within RCC section Assume 6-ft wide x 10-ft high across base of dam Assume Symons Panel system for 12" RCC lifts		4,800	LF	\$50.00	\$240,000.00
	43	F&I 12-in PVC waterstops for u/s CrJs & facing elements Assume 135 CrJs @ 50-ft centers		119,000	LF	\$15.00	\$1,785,000.00
	44	F&I Crack inducers @ CrJs in facing elements (Assume 1/2 L of waterstops and 6 ft wide) Similar to Milltown Hill		59,500	LF	\$15.00	\$892,500.00
	45	F&I Metal crack inducer plates for CrJs in RCC Assume placed every other lift Similar to Pueblo Dam		5,587,000	LF	\$8.00	\$44,696,000.00
		Abutment Adits	D8130				
	46	Drill and shoot 16-ft Dia. for adit (15,500 CY)		1,100	LF	\$2,500.00	\$2,750,000.00
	47	Remove and stockpile rock (assume local stockpile)		15,500	CY	\$20.00	\$310,000.00
	48	Furnish and install 2500-10-ft long x 1-inch dia. A307, 20K rockbolts		12,500	LF	\$60.00	\$750,000.00
	49	Furnish and install steel sets (W8 x 48) in crown		200,000	LBS	\$4.00	\$800,000.00
	50	FF & P concrete in adits (6' x 10')		7,300	CY	\$350.00	\$2,555,000.00
	51	Furnish and handle cement (.282T/CY)		2,100	TONS	\$120.00	\$252,000.00
		Grout adits	D8130				
	52	Setups for drilling grout holes (2-in dia holes, 10 ft ctrs, and 8 holes per ring)		880	EA	\$100.00	\$88,000.00
	53	Drill grout holes (2-in dia and L=30 ft)		26,400	LF	\$20.00	\$528,000.00
	54	Hookups to grout holes		880	EA	\$100.00	\$88,000.00
	55	Pressure grout (grouting process only minus cement) Assume 2 CF per 1 LF of hole		52,800	CF	\$8.00	\$422,400.00
	56	Furnish and handle cement for pressure grouting Assume 1 bag per CF		52,800	BAGS	\$10.00	\$528,000.00
		Dam 3 Subtotal					\$57,034,900.00

QUANTITIES

PRICES

BY Doug Stanton <i>DS</i>	CHECKED <i>GBR</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>GBR 3/17/04</i>
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DS 8/17/04</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir
 Large Reservoir - Active Storage= 1.3 MAF
 River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

ROW1 - Civil/Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Establish Upstream Portal	D8130				
	1	Common excavation to establish tunnel portal		67,000	CY	\$10.00	\$670,000.00
	2	Rock excavation to establish tunnel portal		8,300	CY	\$30.00	\$249,000.00
	3	Furnish and install chain link fabric around portal		350	SY	\$20.00	\$7,000.00
	4	F&I 18-inch x 1/2 in. dia resin anchors for fabric support		40	EA	\$75.00	\$3,000.00
		Establish Downstream Portal	D8130				
	5	Common excavation to establish tunnel portal		67,000	CY	\$10.00	\$670,000.00
	6	Rock excavation to establish tunnel portal		8,300	CY	\$30.00	\$249,000.00
	7	Furnish and install chain link fabric around portal		350	SY	\$20.00	\$7,000.00
	8	F&I 18-inch x 1/2 in. dia resin anchors for fabric		40	EA	\$75.00	\$3,000.00
		Construct ROW tunnel u/s of gate chamber	D8130				
	9	Drill and shoot 28-ft Dia.circular shaped u/s tunnel (18,400 CY)		700	LF	\$4,000.00	\$2,800,000.00
	10	Remove and stockpile rock (assume local stockpile)		18,400	CY	\$20.00	\$368,000.00
	11	Furnish and install 790-10-ft long x 1-inch dia. A307, 20K rockbolts		7,900	LF	\$60.00	\$474,000.00
	12	Furnish and install 9 steel sets (W8 x 48) in crown		45,000	LBS	\$4.00	\$180,000.00
		Construct ROW tunnel d/s of gate chamber	D8130				
	13	Drill and shoot 32-ft OD mod.HS shaped d/s tunnel (23,000 CY)		600	LF	\$5,500.00	\$3,300,000.00
	14	Remove and stockpile rock (assume local stockpile)		23,000	CY	\$20.00	\$460,000.00
	15	Furnish and install 740-10-ft long x 1-inch dia. A307, 20K rockbolts		7,400	LF	\$60.00	\$444,000.00
	16	Furnish and install 9 steel sets (W10 x 54) in crown		47,000	LBS	\$4.00	\$188,000.00
		Construct ROW Gate Chamber and Shaft	D8130				
	17	Drill and shoot 24-ft diameter shaft (800 CY)		40	LF	\$7,000.00	\$280,000.00
	18	Remove and stockpile rock (assume local stockpile)		800	CY	\$20.00	\$16,000.00
	19	Furnish and install 64 - 10-ft long x 1-inch dia. A307, 20K rockbolts		640	LF	\$75.00	\$48,000.00
	20	Furnish and install 4 circular steel sets (W8 x 48)		17,000	LBS	\$4.00	\$68,000.00
		Place Conc. Lining In Tunnel, Shaft & Gate Chamber	D8130				
	21	FF&P reinf. Concrete in u/s steel-lined tunnel		10,200	CY	\$350.00	\$3,570,000.00
	22	FF&P reinf. concrete gate chamber		600	CY	\$500.00	\$300,000.00
	23	FP&P reinf. Concrete in d/s tunnel		11,400	CY	\$350.00	\$3,990,000.00
	24	Furnish and place reinforcement (160 lbs/CY)		3,550,000	LBS	\$0.90	\$3,195,000.00
	25	Furnish and handle cement (.282T/CY)		6,300	TONS	\$120.00	\$756,000.00
		ROW1 Subtotal					\$22,295,000.00

QUANTITIES

PRICES

BY Doug Stanton <i>DS</i>	CHECKED <i>DS</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>DD</i> 8/17/04
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DS</i> 8/17/04

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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ROW1 - Civil/Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Ring Grout Upstream Conduit	D8130				
	26	Setups for drilling grout holes (2-in dia holes, 20 ft ctrs, and 8 holes per ring)		36	EA	\$150.00	\$5,400.00
	27	Drill grout holes (2-in dia and L=30 ft)		8,640	LF	\$20.00	\$172,800.00
	28	Hookups to grout holes		288	EA	\$100.00	\$28,800.00
	29	Pressure grout (grouting process only minus cement) Assume 2 CF per 1 LF of hole		17,300	CF	\$10.00	\$173,000.00
	30	Furnish and handle cement for pressure grouting Assume 1 bag per CF		17,300	BAGS	\$12.00	\$207,600.00
		Ring Grout Shaft and Gate Chamber	D8130				
	31	Setups for drilling grout holes (2-in dia holes, 20 ft ctrs, and 8 holes per ring)		5	EA	\$200.00	\$1,000.00
	32	Drill grout holes (2-in dia and L=30 ft)		1,200	LF	\$25.00	\$30,000.00
	33	Hookups to grout holes		40	EA	\$150.00	\$6,000.00
	34	Pressure grout (grouting process only minus cement) Assume 2 CF per 1 LF of hole		2,400	CF	\$15.00	\$36,000.00
	35	Furnish and handle cement for pressure grouting Assume 1 bag per CF		2,400	BAGS	\$15.00	\$36,000.00
		Ring Grout Downstream Conduit	D8130				
	36	Setups for drilling grout holes (2-in dia holes, 20 ft ctrs, and 8 holes per ring)		6	EA	\$200.00	\$1,200.00
	37	Drill grout holes (2-in dia and L=30 ft)		1,440	LF	\$25.00	\$36,000.00
	38	Hookups to grout holes		48	EA	\$150.00	\$7,200.00
	39	Pressure grout (grouting process only minus cement) Assume 2 CF per 1 LF of hole		2,880	CF	\$15.00	\$43,200.00
	40	Furnish and handle cement for pressure grouting Assume 1 bag per CF		2,880	BAGS	\$15.00	\$43,200.00
		Earthwork - intake, u/s conduit, d/s pipe, stilling basin and discharge channel	D8130				
	41	Excavation of common materials for basin and channel		400,000	CY	\$4.00	\$1,600,000.00
	42	F & P impervious material (Zone 6 Ringold - local)		20,000	CY	\$4.50	\$90,000.00
	43	F & P bedding for riprap (zone 3 gravel)		10,000	CY	\$30.00	\$300,000.00
	44	F & P rockfill from dam excavation (riprap)		30,000	CY	\$10.00	\$300,000.00
	45	F & P backfill for intake and u/s conduit (Ringold - local)		16,000	CY	\$7.00	\$112,000.00
	46	Excavation of common materials for burying 16' pipe		312,000	CY	\$5.00	\$1,560,000.00
	47	Backfill for burying 16' dia. Pipe - zone 3 bedding		20,000	CY	\$40.00	\$800,000.00
	48	Backfill for burying 16' dia. Pipe - From common exc.		197,000	CY	\$7.00	\$1,379,000.00
		ROW1 Subtotal					\$6,968,400.00

QUANTITIES**PRICES**

BY Doug Stanton <i>DS</i>	CHECKED <i>GB</i>	BY D. Donaldson <i>DD</i>	CHECKED BOV 8/17/04
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>RAS 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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ROW1 - Civil/Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct ROW cast in place (CIP) concrete	D8130				
	49	Furnish, form, and place reinf. Conc - Intake structure		12,000	CY	\$350.00	\$4,200,000.00
	50	Furnish and place reinforcement (est 180#/CY)		2,160,000	LBS	\$0.80	\$1,728,000.00
	51	Furnish and handle cement (.282T/CY)		3,400	TONS	\$120.00	\$408,000.00
	52	FFP Reinf. Conc - Steel lined U/S Conduit (L=400')		11,000	CY	\$350.00	\$3,850,000.00
	53	Furnish and place reinforcement (est 170#/CY)		1,870,000	LBS	\$0.80	\$1,496,000.00
	54	Furnish and handle cement (.282T/CY)		3,100	TONS	\$120.00	\$372,000.00
	55	FFP reinf. concrete - CIP shaft (L=375)		6,400	CY	\$350.00	\$2,240,000.00
	56	Furnish and place reinforcement (est 170#/CY)		1,088,000	LBS	\$0.80	\$870,400.00
	57	Furnish and handle cement (.282T/CY)		1,800	TONS	\$130.00	\$234,000.00
	58	FFP reinf. concrete - shaft control house		440	CY	\$500.00	\$220,000.00
	59	Furnish and place reinforcement (160#/CY)		70,000	LBS	\$1.00	\$70,000.00
	60	Furnish and handle cement (.282T/CY)		120	TONS	\$160.00	\$19,200.00
	61	FFP reinf. Concrete in gate chamber		450	CY	\$500.00	\$225,000.00
	62	Furnish and place reinforcement (160#/CY)		72,000	LBS	\$1.00	\$72,000.00
	63	Furnish and handle cement (.282T/CY)		130	TONS	\$160.00	\$20,800.00
	64	FFP reinf. concrete - D/S access house		500	CY	\$500.00	\$250,000.00
	65	Furnish and place reinforcement (160#/CY)		80,000	LBS	\$1.00	\$80,000.00
	66	Furnish and handle cement (.282T/CY)		140	TONS	\$160.00	\$22,400.00
	67	FFP reinf. concrete for thrust block @ 80 deg bend		5,100	CY	\$400.00	\$2,040,000.00
	68	Furnish and place reinforcement (130 #/cy)		663,000	LBS	\$0.80	\$530,400.00
	69	Furnish and handle cement (.20T/CY)		1,020	TONS	\$130.00	\$132,600.00
	70	FFP reinf. concrete - jet flow gate control house		700	CY	\$800.00	\$560,000.00
	71	Furnish and place reinforcement (160#/CY)		112,000	LBS	\$1.00	\$112,000.00
	72	Furnish and handle cement (.282T/CY)		200	TONS	\$160.00	\$32,000.00
	73	FFP reinf. concrete for thrust block @ jet gate house		4,100	CY	\$400.00	\$1,640,000.00
	74	Furnish and place reinforcement (130 #/cy)		533,000	LBS	\$0.80	\$426,400.00
	75	Furnish and handle cement (.20T/CY)		820	TONS	\$140.00	\$114,800.00
		ROW1 Subtotal					\$21,966,000.00

QUANTITIES

PRICES

BY Doug Stanton <i>DS</i>	CHECKED <i>GR</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>BD 8/17/04</i>
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BD 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir
 Large Reservoir - Active Storage= 1.3 MAF
 River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

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Appraisal

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ROW1 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	76	Miscellaneous Metalwork Assume ladder in shaft to gate chamber, elevator rail supports, misc metal in gate house, gate chamber and D/S gate house.	D8120	14,000	LBS	\$7.00	\$98,000.00
		Mechanical					
	77	Furnish and install steel trashracks	D8410	337,500	LBS	\$4.00	\$1,350,000.00
	78	Furnish and install one bulkhead 22' x 24' @ 400' head	D8410	144,000	LBS	\$4.00	\$576,000.00
	79	Furnish and install seats and guides with lid	D8410	23,900	LBS	\$6.00	\$143,400.00
	80	Furnish and install one elevator, capacity = 500 lbs (2 person), speed = 100 fpm, travel = 450', landings = 2, type = freight	D8410	1	UNIT	\$150,000.00	\$150,000.00
		HVAC for: 4200-ft long by 26-ft dia. penstock tunnel and 430-ft deep by 24' dia shaft to gate chamber)	D-8410				
	81	Centrifugal fan rated: 16,000cfm @ 8" static pressure, 1200 fan rpm max, 2200-fpm max. fan outlet velocity, with adjustable sheave with 2-speed motor for 50% speed (8000-cfm at 2"sp) belt-drive, 30-Hp, 460-V, 3-Ph, 60-Hz, 1800-rpm motor. (approx 700-lbs+motor wt)	D-8410	2	EA	\$15,000.00	\$30,000.00
	82	48" Dia, 16-ga galv st. duct 4700 ft long (Wt with supports approx = 40-lbs/linear ft) For 50-degree F temperature rise for winter ventilation, Assuming 90% recirculated air & 10% outside air	D-8410	188,000	LBS	\$7.50	\$1,410,000.00
	83	30-kVa Electric Duct heaters 480-V, 3-ph, 60-hz with thermostats Note: (100% outside air requires total of 515-kW heat for 32000 cfm for construction level ventilation or 210-kW for inspection level ventilation)	D-8410	2	EA	\$15,000.00	\$30,000.00
		ROW1 Subtotal					\$3,787,400.00
QUANTITIES			PRICES				
BY D. LaFond (D8120)	CHECKED <i>M.R.O. Egan (D-8120)</i>		BY D. Donaldson	CHECKED <i>BW 8/17/04</i>			
P. Schlein, A. Ritt, R. Christensen (D8410)	<i>Am</i>		<i>Deo</i>				
DATE PREPARED 4/24/04	PEER REVIEW		DATE PREPARED 08/17/04	PEER REVIEW <i>Jim 8/18/04</i>			

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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ROW1 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont.)					
		Heating and Ventilating	D-8410				
		50'x40'x24' Control House					
	84	Centrifugal fan: 1 each Single speed, 1500 cfm at 0.50 inches w.g. static pressure, forward curve, direct drive; 3/4 hp motor rated 480 Vac, Three phase, 60 Hz.	D-8410	1	EA	\$2,500.00	\$2,500.00
	85	Propeller fan assembly: 1 each Single speed, 4,800 cfm at 0.50 inches w.g. static pressure, belt drive; 1.5 hp motor rated 460 Vac, three phase, 60 Hz; include fan wall mount housing with motor guard.	D-8410	1	EA	\$3,000.00	\$3,000.00
	86	Unit heaters: Electric horizontal discharge rated 7.5 kw, 460 Vac, 3-phase, 60 Hz. (One each corner - 18' throw) with wall thermostats	D-8410	4	EA	\$750.00	\$3,000.00
	87	Control dampers: All motor operated, parallel blade, low leakage type with edge and side seals: 48" wide x 48" high - 1 each 36" wide x 36" high - 1 each	D-8410	1 1	EA EA	\$2,500.00 \$1,500.00	\$2,500.00 \$1,500.00
	88	Stationary louvers: All 16 gauge galvanized steel, 4-inch deep frame, 45 degree blades on 4-inch centers, 45 percent free area, with insect and bird screen: 48" wide x 48" high - 1 each 36" wide x 36" high - 1 each	D-8410	1 1	EA EA	\$2,000.00 \$1,000.00	\$2,000.00 \$1,000.00
		ROW1 Subtotal					\$15,500.00

QUANTITIES

PRICES

BY Paul Schlein	CHECKED <i>AMS</i>	BY D. Donaldson <i>DeD</i>	CHECKED Gov 8/17/04
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>AS 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir Large Reservoir - Active Storage= 1.3 MAF River Outlet Works for Rockfill Dams			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
		(Continuation of HVAC System)	D-8410				
		(50'x40'x24' Control House)					
	89	Fan motor starters: Design, furnish and install control system	D-8410	2	EA	\$2,500.00	\$5,000.00
	90	Ductwork: All 16-gauge galvanized steel with extra heavy (ASTM A90 G120) galvanized coating: Air plenum: 250 lbs.	D-8410	250	LBS	\$10.00	\$2,500.00
	91	48"x48" galv steel intake air filter frames using nine(9) 24"x16"x2" disposable filter elements in frame with dirty filter differential pressure sensor with warning light and remote signal.	D-8410	1	EA	\$2,000.00	\$2,000.00
	92	16"x24"x2" disposable fiberglass, 30% min efficiency, Filter elements (estimate 9 elements with spares for testing, startup and two replacements each.	D-8410	36	EA	\$25.00	\$900.00
	93	Galv. Steel duct and fan supports.	D-8410	200	LBS	\$10.00	\$2,000.00
		ROW1 Subtotal					\$12,400.00
QUANTITIES			PRICES				
BY Paul Schlein		CHECKED <i>AAR</i>	BY D. Donaldson <i>DD</i>		CHECKED <i>BOV</i> 6/17/04		
DATE PREPARED 4/24/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>RAS</i> 8/17/04		

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

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Appraisal

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ROW1 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Steel penstock					
		FURNISH-AND-INSTALL THE FOLLOWING:	D8420				
	94	240-inch steel pipe, encased in concrete (1000 linear feet, 1-1/2-inch wall, 4290 lb per lin. ft.)		4,260,000	LBS	\$2.00	\$8,520,000.00
	95	192-inch steel pipe, encased in concrete (1000 linear feet, 1-1/4-inch wall, 2841 lb per lin. ft.)		2,840,000	LBS	\$2.00	\$5,680,000.00
	96	192-inch steel pipe, buried (273 linear feet, 1-1/16-inch wall, 2412 lb per lin. ft.)		660,000	LBS	\$2.00	\$1,320,000.00
	97	192-inch steel pipe, buried (601 linear feet, 1-inch wall, 2269 lb per lin. ft.)		1,360,000	LBS	\$2.00	\$2,720,000.00
	98	192-inch steel pipe, buried (601 linear feet, 15/16-inch wall, 2127 lb per lin. ft.)		1,280,000	LBS	\$2.00	\$2,560,000.00
	99	192-inch steel pipe, buried (601 linear feet, 7/8-inch wall, 1985 lb per lin. ft.)		1,190,000	LBS	\$2.00	\$2,380,000.00
	100	192-inch steel pipe, buried (600 linear feet, 13/16-inch wall, 1842 lb per lin. ft.)		1,110,000	LBS	\$2.00	\$2,220,000.00
	101	120-inch steel pipe, buried and exposed (100 linear feet, 13/16-inch wall, 1154 lb per lin. ft.)		115,000	LBS	\$2.00	\$230,000.00
	102	60-inch steel pipe, vertical, grouted, air vent (418 linear feet, 3/8-inch wall, 266 lb per lin. ft.)		115,000	LBS	\$2.50	\$287,500.00
		ROW1 Subtotal					\$25,917,500.00 ✓

QUANTITIES

PRICES

BY Ken Smith	CHECKED	BY D. Donaldson <i>DCD</i>	CHECKED SDV 8/17/04
DATE PREPARED 4/26/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>ZAS 8/17/04</i>

ESTIMATE WORKSHEET

[illegible]

FEATURE:

Black Rock Dam and Reservoir
 Large Reservoir - Active Storage= 1.3 MAF
 River Outlet Works for Rockfill Dams

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock
 Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

ROW1 - Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Electrical					
		This estimate is for 2 ROW control bldgs, one on top of dam and the other downstream for the regulating gates. Assume bringing power to dam part of unlisted items.					
		Furnish and install the following electrical equipment:					
		Grounding System	D-8430				
	107	Ground rods, 10 ft, 3/4" dia., copper-clad		6	EA	\$180.00	\$1,080.00
	108	Stranded bare-copper conductor, 4 AWG		250	LF	\$2.50	\$625.00
		Conduit System	D-8430				
		Rigid steel conduit					
	109	3/4-inch		200	LF	\$12.00	\$2,400.00
	110	1-inch		100	LF	\$14.00	\$1,400.00
		PVC conduit, Schedule 40					
	111	1 1/2-inch		600	LF	\$10.00	\$6,000.00
		HDPE (High-density polyethylene)					
	112	2-inch		1,000	LF	\$15.00	\$15,000.00
		Conductors & Cable	D-8430				
		All cable single conductor, stranded copper					
	113	12 AWG		1,500	LF	\$0.90	\$1,350.00
	114	10 AWG		500	LF	\$1.20	\$600.00
	115	2 AWG		2,000	LF	\$2.20	\$4,400.00
	116	1/0 AWG		400	LF	\$2.90	\$1,160.00
		Electrical Service Equipment	D-8430				
	117	Pole-mounted transformer, 100 kVA, 13.8 kV-480V		1	EA	\$5,000.00	\$5,000.00
	118	Meter socket, NEMA 3R, 600V, 3-phase		1	EA	\$1,500.00	\$1,500.00
	119	Safety switch, heavy-duty, NEMA 3R, fusible 3-wire, 600V, 100 ampere		1	EA	\$1,000.00	\$1,000.00
		Panelboards & Electrical Distribution Equipment					
	120	Panelboard, 3-phase, 480V, 250 ampere		1	EA	\$30,000.00	\$30,000.00
	121	Distribution load center, 15 kVA, 1-phase 480-240/120V		2	EA	\$11,000.00	\$22,000.00
		ROW1 Subtotal					\$93,515.00

QUANTITIES**PRICES**

BY Mike Schuh	CHECKED <i>L. Rumi</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>DN 8/17/04</i>
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DS 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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ROW2 - Civil/Structural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		General assumptions					
		Assume ROW located on Rt abutment					
		Cut into rock after dam excavation					
		Assume pipe buried d/s of dam					
		Assume pipe encased in concrete in dam					
		Assume RCC test section will be the thrust block					
		Foundation preparation	D8130				
	1	Excavation of rock for OW pipe (hydraulic excavator)		6,000	CY	\$32.00	\$192,000.00
	2	Excavation of common materials for pipe and house		200,000	CY	\$5.00	\$1,000,000.00
	3	Backfill for burying 14' dia. Pipe - zone 3 bedding		5,000	CY	\$40.00	\$200,000.00
	4	Backfill pipe with common materials from excavation		200,000	CY	\$7.00	\$1,400,000.00
	5	Furnish and install - 40 -10-ft long x 1-inch dia., A307 20K rockbolts - assume 1 every 10 feet		400	LF	\$100.00	\$40,000.00
		Install pipe on abutment	D8130				
	6	Furnish, form, and place reinforced concrete		6,000	CY	\$350.00	\$2,100,000.00
	7	Furnish and place reinforcement (165 lbs/CY)		1,000,000	LBS	\$0.80	\$800,000.00
	8	Furnish and handle cement (.282T/CY)		1,700	TONS	\$130.00	\$221,000.00
		Construct Fixed Wheel Gate Control House	D8130				
	9	FFP reinf. concrete - fixed wheel gate control house		700	CY	\$800.00	\$560,000.00
	10	Furnish and place reinforcement (160#/CY)		112,000	LBS	\$1.00	\$112,000.00
	11	Furnish and handle cement (.282T/CY)		200	TONS	\$160.00	\$32,000.00
		Construct Jet Flow Gate Control House	D8130				
	12	FFP reinf. concrete - jet flow gate control house		700	CY	\$800.00	\$560,000.00
	13	Furnish and place reinforcement (160#/CY)		112,000	LBS	\$1.00	\$112,000.00
	14	Furnish and handle cement (.282T/CY)		200	TONS	\$160.00	\$32,000.00
		Construct stilling basin for jet flow gate discharge	D8130				
	15	Excavation of common materials for basin and channel		400,000	CY	\$4.00	\$1,600,000.00
	16	F & P impervious material (Zone 6 Ringold - local)		20,000	CY	\$4.50	\$90,000.00
	17	F & P bedding for riprap (zone 3 gravel)		10,000	CY	\$30.00	\$300,000.00
	18	F & P rockfill from dam excavation		30,000	CY	\$8.00	\$240,000.00
		ROW2 Subtotal					\$9,591,000.00

QUANTITIES

PRICES

BY Doug Stanton <i>DS</i>	CHECKED <i>GR</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>BDV 8/17/04</i>
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Don 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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ROW2 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	19	Miscellaneous Metalwork	D8120	3,000	LBS	\$7.00	\$21,000.00
		Assume misc metal in fixed wheel and jet flow gate houses					
		Mechanical					
	20	Furnish and install steel trashracks	D8410	337,500	LBS	\$4.00	\$1,350,000.00
	21	Furnish and install one bulkhead 22' x 24' @ 500' head	D8410	160,000	LBS	\$4.00	\$640,000.00
	22	Furnish and install seats and guides	D8410	127,000	LBS	\$6.00	\$762,000.00
		Heating and Ventilating	D-8410				
		50'x40'x24' Control House					
	23	Centrifugal fan: 1 each	D-8410	1	EA	\$2,500.00	\$2,500.00
		Single speed, 1500 cfm at 0.50 inches w.g. static pressure, forward curve, direct drive; 3/4 hp motor rated 480 Vac, Three phase, 60 Hz.					
	24	Propeller fan assembly: 1 each	D-8410	1	EA	\$3,000.00	\$3,000.00
		Single speed, 4,800 cfm at 0.50 inches w.g. static pressure, belt drive; 1.5 hp motor rated 460 Vac, three phase, 60 Hz; include fan wall mount housing with motor guard.					
	25	Unit heaters:	D-8410	4	EA	\$750.00	\$3,000.00
		Electric horizontal discharge rated 7.5 kw, 460 Vac, 3-phase, 60 Hz. (One each corner -18' throw) with wall thermostats					
	26	Control dampers: All motor operated, parallel blade, low leakage type with edge and side seals:	D-8410				
		48" wide x 48" high - 1 each		1	EA	\$2,500.00	\$2,500.00
		36" wide x 36" high - 1 each		1	EA	\$1,500.00	\$1,500.00
	27	Stationary louvers: All 16 gauge galvanized steel, 4-inch deep frame, 45 degree blades on 4-inch centers, 45 percent free area, with insect and bird screen:	D-8410				
		48" wide x 48" high - 1 each		1	EA	\$2,000.00	\$2,000.00
		36" wide x 36" high - 1 each		1	EA	\$1,000.00	\$1,000.00
		ROW2 Subtotal					\$2,788,500.00

QUANTITIES

PRICES

BY R.Christensen, B.Sund	CHECKED <i>Aur</i>	BY D. Donaldson	CHECKED <i>BOV 8/17/04</i>
P. Schlein		<i>Red</i>	
DATE PREPARED 4/23/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Red 8/17/04</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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ROW2 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
		Heating and Ventilating	D-8410				
		Galleries and Adits Avg X-section 6'x10' = 60 sq-ft					
	33	Axial fan: Three speed reversible; 9,000 cfm at 1.0 inches w.g. static pressure in high speed mode, 2700 cfm in medium speed mode; 1800 cfm in low speed mode. speed mode; adjustable blade; belt drive, (or adjustable speed controller if cheaper) 10 hp motor rated 460 volts, three phase, 60 Hz. A-weighted, sound pressure level not to exceed 85 dbA.	D-8410	2	EA	\$5,000.00	\$10,000.00
	34	Axial fan: Two speed reversible; 6,000 cfm at 1.0 inches w.g. static pressure in high speed mode, 1800 cfm in low speed mode; adjustable blade; belt drive, (or adjustable speed controller if cheaper) 3 hp motor rated 460 volts, three phase, 60 Hz. A-weighted, sound pressure level not to exceed 85 dbA.	D-8410	3	EA	\$2,500.00	\$7,500.00
	35	40-kW Electric duct heaters with controls. (one at each fan -2 operate for inspection only for 2700 cfm at 45-deg rise. 460 Vac, 3-phase, 60 Hz. (One each at each inlet) with duct thermostats	D-8410	2	EA	\$20,000.00	\$40,000.00
	36	Control dampers: All motor operated, parallel blade, low leakage type with edge and side seals: 48" wide x 48" high - 48" wide x 36" high -	D-8410	2 5	EA EA	\$2,500.00 \$2,000.00	\$5,000.00 \$10,000.00
	37	Stationary louvers: All 16 gauge galvanized steel, 4-inch deep frame, 45 degree blades on 4-inch centers, 45 percent free area, with insect and bird screen: 48" wide x 48" high - 48" wide x 36" high -	D-8410	2 5	EA EA	\$2,000.00 \$1,500.00	\$4,000.00 \$7,500.00
		ROW2 Subtotal					\$84,000.00

QUANTITIES

PRICES

BY Paul Schlein	CHECKED AMR	BY D. Donaldson	CHECKED BOW 8/17/04
DATE PREPARED 4/26/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW Ras 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

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ROW2 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
		(Continuation of HVAC System)	D-8410				
	38	Reversing, 3-Ph., Fan motor starters : Design, furnish and install: control system	D-8410	5	EA	\$2,500.00	\$12,500.00
	39	Ductwork: All 16-gauge galvanized steel with extra heavy (ASTM A90 G120) galvanized coating; Air plenum: 250 lbs. 48x48 = 45-lb/ft x20 ft 900 lb/fan x2 = 1800-lb 48x32= 38-lb/ft x 10-ft = 380 lb x5 units 1900	D-8410	3,700	LBS	\$10.00	\$37,000.00
	40	48"x48" galv steel intake air filter frames using sixteen(16) 16"x16"x2" disposable filter elements in frame with dirty filter differential pressure sensor with warning light and remote signal.	D-8410	2	EA	\$2,000.00	\$4,000.00
	41	16"x16"x2" disposable fiberglass, 30% min efficiency. Filter elements (estimate 16 elements with spares for testing, startup and two replacements each.	D-8410	128	EA	\$25.00	\$3,200.00
	42	Galv. Steel duct and fan supports.	D-8410	1,000	LBS	\$10.00	\$10,000.00
		ROW2 Subtotal					\$66,700.00

QUANTITIES

PRICES

BY Paul Schlein	CHECKED <i>Amc</i>	BY D. Donaldson <i>Dea</i>	CHECKED <i>Gov 8/17/04</i>
DATE PREPARED 4/26/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Pos 8/18/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

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ROW2 - Mechanical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
		FURNISH-AND-INSTALL THE FOLLOWING:					
		Steel outlet works pipe, air vent	D8420				
		Steel plate used for pipe fabrication: ASTM A36: yield stress = 36000 psi					
		(All pipe sizes are inside diameter)					
	43	168-inch diameter, 1 5/16-inch wall 1450 linear feet, 2613 lb/ft		3,800,000	lbs	\$2.00	\$7,600,000.00
	44	120-inch diameter, 1 5/16-inch wall 100 linear feet, 1333 lb/ft		135,000	lbs	\$2.00	\$270,000.00
	45	60-inch diameter, 1/2-inch wall, vertical, for air vent 615 linear feet, 356 lb/ft		220,000	lbs	\$2.00	\$440,000.00
		Gates and Gate Controls					
		Furnish and Install					
	46	F & I - 18' x 14' Roller gate w/controls 1 - gate and 1 control box (in shaft house)	D8420	180,400	LBS	\$8.00	\$1,443,200.00
	47	F&I structural steel for hoist support		10,000	LBS	\$4.00	\$40,000.00
	48	F & I - 2 - 108-inch jet flow gates w/controls 2 gates and 1 control box		89,400	LBS	\$8.00	\$715,200.00
	49	F & I - 36-inch jet flow gate w/controls and bypass pipe 1 gate and 1 control box (in shaft house)		30,000	LBS	\$8.00	\$240,000.00
		ROW2 Subtotal					\$10,748,400.00
QUANTITIES			PRICES				
BY	Ken Smith, Gary Rood		CHECKED				
DATE PREPARED	4/27/04		PEER REVIEW				
BY	D. Donaldson		CHECKED	60V 8/17/04			
DATE PREPARED	08/17/04		PEER REVIEW	206 8/17/04			

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Large Reservoir - Active Storage= 1.3 MAF

River Outlet Works for RCC Dam

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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ROW2 - Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Electrical					
		This estimate is for 2 ROW control bldgs, one on top of dam and the other downstream for the regulating gates.					
		Assume bringing power to dam part of unlisted items.					
		Furnish and install the following electrical equipment:					
		Grounding System	D-8430				
	50	Ground rods, 10 ft, 3/4" dia., copper-clad		6	EA	\$180.00	\$1,080.00
	51	Stranded bare-copper conductor, 4 AWG		250	LF	\$2.50	\$625.00
		Conduit System	D-8430				
		Rigid steel conduit					
	52	3/4-inch		200	LF	\$12.00	\$2,400.00
	53	1-inch		100	LF	\$14.00	\$1,400.00
		PVC conduit, Schedule 40					
	54	1 1/2-inch		600	LF	\$10.00	\$6,000.00
		HDPE (High-density polyethylene)					
	55	2-inch		1,000	LF	\$15.00	\$15,000.00
		Conductors & Cable	D-8430				
		All cable single conductor, stranded copper					
	56	12 AWG		1,500	LF	\$0.90	\$1,350.00
	57	10 AWG		500	LF	\$1.20	\$600.00
	58	2 AWG		2,000	LF	\$2.20	\$4,400.00
	59	1/0 AWG		400	LF	\$2.90	\$1,160.00
		Electrical Service Equipment	D-8430				
	60	Pole-mounted transformer; 100 kVA, 13.8kV-480V		1	EA	\$5,000.00	\$5,000.00
	61	Meter socket, NEMA 3R, 600V, 3-phase		1	EA	\$1,500.00	\$1,500.00
	62	Safety switch, heavy-duty, NEMA 3R, fusible 3-wire, 600V, 100 ampere		1	EA	\$1,000.00	\$1,000.00
		Panelboards & Electrical Distribution Equipment					
	63	Panelboard, 3-phase, 480V, 250 ampere		1	EA	\$30,000.00	\$30,000.00
	64	Distribution load center, 15 kVA, 1-phase 480-240/120V		2	EA	\$11,000.00	\$22,000.00
		ROW2 Subtotal					\$93,515.00
QUANTITIES			PRICES				
BY	CHECKED		BY	CHECKED			
Mike Schuh	L Romi		D. Donaldson	DSD		SDY 8/17/04	
DATE PREPARED	PEER REVIEW		DATE PREPARED	PEER REVIEW			
4/26/04			08/17/04	LMS 8/16/04			

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir
 Large Reservoir - Active Storage= 1.3 MAF
 Relocation of State Highway 24

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\Black Rock Dam_1.3MAF Rev 1.xls\Summary

SH24 - Civil

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		State Highway Relocation (11.8 miles)					
	1	Clear roadway alignment	D8140	280	AC	\$3,000.00	\$840,000.00
	2	Excavation from borrow	D8140	1,000,000	CY	\$3.50	\$3,500,000.00
	3	Excavation for roadway (assume 70% rock material)	D8140	5,200,000	CY	\$5.50	\$28,600,000.00
	4	Compacting roadway embankments (subbase)	D8140	5,900,000	CY	\$1.50	\$8,850,000.00
	5	Furnish and place base course material	D8140	150,000	TONS	\$16.00	\$2,400,000.00
	6	Furnish and place asphalt concrete	D8140	97,000	TONS	\$60.00	\$5,820,000.00
	7	Furnish and install W-beam type guardrail	D8140	58,000	LF	\$30.00	\$1,740,000.00
	8	Furnish and install miscellaneous pipe culverts Assume 60-inch-diameter, w/ft=100 lbs/ft.	D8140	1,800	LF	\$200.00	\$360,000.00
		Utility Relocations within Reservoir Inundation					
	9	Remove Existing Transmission Lines Two 115-kV H-frame wood-pole lines, 60-feet apart 954 AWG conductor	D8440	7	miles	\$50,000.00	\$350,000.00
	10	Construct Transmission Lines Two 115-kV H-frame wood-pole lines, 60-feet apart 954 AWG conductor	D8440	12	miles	\$375,000.00	\$4,500,000.00
	11	Install new buried fiber optic line along new SH24 ROW Assume abandon existing line.	D-8120	12	miles	\$30,000.00	\$360,000.00
		SH24 Subtotal					\$57,320,000.00

QUANTITIES

PRICES

BY Anne Pavot	CHECKED <i>Chen Cho</i>	BY D. Donaldson <i>DeD</i>	CHECKED BOV 8/17/04
DATE PREPARED 4/24/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>RM 8/17/04</i>

Black Rock Dam and Reservoir
Small Reservoir
Active Storage= 0.8 MAF

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Summary Sheet 1 of 3

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Estimate Worksheets Identify Three Dam Types					
		Dam Type 1: Concrete-Faced Rockfill Dam					
		Dam Type 2: Central-Core Rockfill Dam					
		Dam Type 3: Roller Compacted Concrete Dam					
		DAM TYPE 1: CONCRETE-FACED ROCKFILL					
		Includes foundation treatment, dam structure, river outlet works, and relocation of State Highway 24.					
		Dam1 Subtotal					\$621,530,800.00 ✓
		River Outlet Works (ROW1) Subtotal					\$79,000,000.00 ✓
		Relocation of State Highway 24 Subtotal					\$57,320,000.00 ✓
		Subtotal					\$757,850,800.00 ✓
		Mobilization 5% (+/-)					\$38,000,000.00 ✓
		Subtotal w/ mobilization					\$795,850,800.00 ✓
		Unlisted Items 10% (+/-)					\$84,149,200.00 ✓
		DAM TYPE 1: CONTRACT COST					\$880,000,000.00 ✓
		Contingencies 25% (+/-)					\$220,000,000.00 ✓
		DAM TYPE 1: FIELD COST					\$1,100,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	D. Donaldson		CHECKED	
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Summary Sheet 2 of 3

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		DAM TYPE 2: CENTRAL CORE ROCKFILL					
		Includes foundation treatment, dam structure, river outlet works, and relocation of State Highway 24.					
		Dam2 Subtotal					\$573,117,150.00 ✓
		River Outlet Works (ROW1) Subtotal					\$79,000,000.00 ✓
		Relocation of State Highway 24 Subtotal					\$57,320,000.00 ✓
		Subtotal					\$709,437,150.00 ✓
		Mobilization 5% (+/-)					\$35,000,000.00 ✓
		Subtotal w/ mobilization					\$744,437,150.00 ✓
		Unlisted Items 10% (+/-)					\$75,562,850.00 ✓
		DAM TYPE 2: CONTRACT COST					\$820,000,000.00 ✓
		Contingencies 25% (+/-)					\$180,000,000.00 ✓
		DAM TYPE 2: FIELD COST					\$1,000,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	D. Donaldson		CHECKED	60 ✓ 8/12/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	2ms 8/12/04

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Summary Sheet 3 of 3

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 1: Concrete-Faced Rockfill Dam

Dam 1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

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PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK					
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are part of unlisted items					
		DIVERSION & DEWATERING					
		Assume groundwater is below excavation					
		Assume natural stream beds in area are dry					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse					
		Assume rock material stockpiled for reuse					
		Stockpiles will be upstream, within 1/2 mile of dam					
	1	Excavation, stripping, of dam foundation Assume depth of stripping 12 inches or less Assume stripping will be stockpiled for topsoil use	D8312	315,000	CY	\$2.00	\$630,000.00
	2	Excavation, common, for dam foundation Assume about 35% of volume requires ripping Assume fine-grained and coarse-grained materials will be separately stockpiled	D8312	23,700,000	CY	\$3.00	\$71,100,000.00
	3	Excavation, rock, for dam foundation Assume drill and blast in random locations	D8312	1,700	CY	\$45.00	\$76,500.00
		FOUNDATION TREATMENT					
		Includes misc. foundation treatment, fault zone treatment, consolidation grouting, and curtain grouting					
		Miscellaneous Foundation Areas					
		Applied in areas of poor quality rock					
	4	Slush grouting of foundation surface Over assumed 10% of area between u/s toe and axis	D8312	140,000	SF	\$2.00	\$280,000.00
	5	Dental concrete	D8312	1,700	CY	\$150.00	\$255,000.00
	6	Furnish/place zone 2 sand filter on foundation Over assumed 10% of area between u/s toe and axis Assume a 3-ft thickness	D8312	34,000	CY	\$28.00	\$952,000.00
	7	Furnish/place zone 3 gravel drain on foundation Over the zone 2 filter in a 3-ft thickness	D8312	34,000	CY	\$25.00	\$850,000.00
		Dam1 Subtotal					\$74,143,500.00
QUANTITIES			PRICES				
BY Will Gonzales	CHECKED Bill Engemoen		BY D. Donaldson <i>beck</i>	CHECKED Bai 8/17/04			
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen		DATE PREPARED 08/17/04	PEER REVIEW <i>2ms 8/17/04</i>			

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 1: Concrete-Faced Rockfill Dam

Dam1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Treatment of south abutment fault area					
	8	Extra rock excavation for fault treatment <i>Assume south abutment is fractured</i> <i>Assume excavate with hydraulic excavator</i>	D8312	135,000	CY	\$13.00	\$1,755,000.00
	9	Dental concrete for fault treatment	D8312	4,200	CY	\$140.00	\$588,000.00
	10	Furnish/place zone 2 sand filter downstream of plinth <i>Assume a 3-ft thickness, 500' by 1000' area</i> <i>Assume same source as listed under embankment</i>	D8312	50,000	CY	\$28.00	\$1,400,000.00
	11	Furnish/place zone 3 gravel drain d/s of plinth <i>Assume 3-ft thickness, over zone 2 filter</i>	D8312	50,000	CY	\$25.00	\$1,250,000.00
		Consolidation Grouting of Foundation <i>Generally limited to area beneath plinth</i>					
	12	Setups for drilling grout holes <i>Assume 2-inch dia. drilled on 7.5-foot centers</i>	D8312	4,170	EA	\$75.00	\$312,750.00
	13	Drill grout holes <i>Assume 2-inch dia. w/length= 30 feet</i>	D8312	125,000	LF	\$15.00	\$1,875,000.00
	14	Hookups to grout holes	D8312	4,170	EA	\$60.00	\$250,200.00
	15	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	190,000	CF	\$7.00	\$1,330,000.00
	16	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	190,000	BAGS	\$8.00	\$1,520,000.00
		Curtain Grouting of Foundation <i>Two-row curtain beneath plinth</i>					
	17	Setups for drilling grout holes <i>Assume 2-rows of 2-inch dia. on 10-ft centers</i>	D8312	1,330	EA	\$100.00	\$133,000.00
	18	Drill grout holes <i>Assume 2-inch dia. w/length from 60 to 250 feet</i>	D8312	260,000	LF	\$15.00	\$3,900,000.00
	19	Hookups to grout holes	D8312	1,330	EA	\$75.00	\$99,750.00
	20	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	520,000	CF	\$7.00	\$3,640,000.00
	21	Furnish and handle cement for pressure grouting	D8312	520,000	BAGS	\$8.00	\$4,160,000.00
		Dam1 Subtotal					\$22,213,700.00

QUANTITIES

PRICES

BY

Will Gonzales

CHECKED

Bill Engemoen

BY

D. Donaldson

CHECKED

601 8/17/04

DATE PREPARED

4/12/2004

PEER REVIEW

Bill Engemoen

DATE PREPARED

08/17/04

PEER REVIEW

200 8/10/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 1: Concrete-Faced Rockfill Dam

Dam1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_08MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		<i>Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation</i>					
	22	Furnish and place zone 1 upstream blanket <i>Consists of loess stockpiled from required exc within 1/2 mile of dam Compaction to 6-inch lifts by tamping roller</i>	D8312	850,000	CY	\$6.00	\$5,100,000.00
	23	Furnish and place zone 2 filter <i>Sand/gravel material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,200,000	CY	\$25.00	\$30,000,000.00
	24	Furnish and place zone 3 drain <i>Gravel/cobble material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,200,000	CY	\$23.00	\$27,600,000.00
	25	Furnish and place zone 4 rockfill <i>Developed from basalt ridges surrounding reservoir Assume average 1-mile haul to dam Rock sizes up to 3-foot Compacted in 3-ft layers by vibratory steel drum</i>	D8312	47,200,000	CY	\$6.50	\$306,800,000.00
	26	Furnish and place zone 5 coarse grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of gravelly soils Compacted in 2-ft layers by vibratory steel drum</i>	D8312	13,150,000	CY	\$4.00	\$52,600,000.00
	27	Furnish and place zone 6 fine grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of sands/silts/clays Compacted to 9-inch layers by tamping rollers</i>	D8312	6,100,000	CY	\$4.50	\$27,450,000.00
		Dam1 Subtotal					\$449,550,000.00

QUANTITIES

PRICES

BY Will Gonzales	CHECKED Bill Engemoen	BY D. Donaldson <i>Dee</i>	CHECKED <i>BNV 8/17/04</i>
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04	PEER REVIEW <i>BNV 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 1: Concrete-Faced Rockfill Dam

Dam1 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CONCRETE FACE & PLINTH CONSTRUCTION					
		Plinth					
		Typical thickness will be 1.5 feet					
		Width will range from 10 to 50 feet					
		Grouted anchors may be needed in poor rock areas					
	28	Furnish and place reinforced concrete in plinth	D8312	10,400	CY	\$350.00	\$3,640,000.00
	29	Furnish and place concrete reinforcement (100#/CY)	D8312	1,040,000	LBS	\$0.80	\$832,000.00
	30	Furnish and handle cement for concrete (.282T/CY)	D8312	2,930	TONS	\$120.00	\$351,600.00
	31	Furnish and install grouted anchors	D8312	285,000	LF	\$15.00	\$4,275,000.00
		Assume 1-inch diameter rebar grouted into rock					
		Assume 15-foot lengths					
		Concrete Deck					
		Will vary in thickness from 1 to 2 feet					
		Adjacent panels will have waterstops and dowels					
	32	Furnish and place reinforced concrete in deck	D8312	165,000	CY	\$300.00	\$49,500,000.00
	33	Furnish and place concrete reinforcement (100#/CY)	D8312	16,500,000	LBS	\$0.75	\$12,375,000.00
	34	Furnish and handle cement for concrete (.282T/CY)	D8312	46,500	TONS	\$100.00	\$4,650,000.00
		MISCELLANEOUS					
		Instrumentation					
		Assume part of unlisted items					
		Toe Drains					
		Assume part of unlisted items					
		Site cleanup and relandscaping					
		Assume part of unlisted items					
		Dam1 Subtotal					\$75,623,600.00

QUANTITIES**PRICES**

BY

Will Gonzales

CHECKED

Bill Engemoen

BY

D. Donaldson

CHECKED

Bov 8/17/04

DATE PREPARED

4/12/2004

PEER REVIEW

Bill Engemoen

DATE PREPARED

08/17/04

PEER REVIEW

Bov 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 2: Central -Core Rockfill Dam

Dam2 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK					
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are part of unlisted items					
		DIVERSION & DEWATERING					
		Assume groundwater is below excavation					
		Assume natural stream beds in area are dry					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse					
		Assume rock material stockpiled for reuse					
		Stockpiles will be upstream, within 1/2 mile of dam					
	1	Excavation, stripping, of dam foundation Assume depth of stripping 12 inches or less Assume stripping will be stockpiled for topsoil use	D8312	320,000	CY	\$2.00	\$640,000.00
	2	Excavation, common, for dam foundation Assume about 35% of volume requires ripping Assume fine-grained and coarse-grained materials will be separately stockpiled	D8312	24,200,000	CY	\$3.00	\$72,600,000.00
	3	Excavation, rock, for dam foundation Assume drill and blast in random locations	D8312	4,200	CY	\$32.00	\$134,400.00
		FOUNDATION TREATMENT					
		Includes misc. foundation treatment, fault zone treatment, consolidation grouting, and curtain grouting					
		Miscellaneous Foundation Areas					
		Applied in areas of poor quality rock					
	4	Slush grouting of foundation surface Over assumed 10% of area beneath zone 1	D8312	140,000	SP	\$2.00	\$280,000.00
	5	Dental concrete	D8312	4,200	CY	\$150.00	\$630,000.00
	6	Furnish/place zone 2 sand filter on foundation Over 10% of area between zone 1 and d/s toe Assume a 3-ft thickness	D8312	34,000	CY	\$28.00	\$952,000.00
	7	Furnish/place zone 3 gravel drain on foundation Over the zone 2 filter in a 3-ft thickness	D8312	34,000	CY	\$25.00	\$850,000.00
		Dam 2 Subtotal					\$76,086,400.00
QUANTITIES			PRICES				
BY Will Gonzales	CHECKED Bill Engemoen		BY D. Donaldson <i>DED</i>	CHECKED <i>BOV 8/17/04</i>			
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen		DATE PREPARED 08/17/04	PEER REVIEW <i>DM 8/17/04</i>			

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 2: Central -Core Rockfill Dam

Dam2 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_08MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Treatment of south abutment fault area					
	8	Extra rock excavation for fault treatment <i>Assume south abutment is fractured</i> <i>Assume excavate with hydraulic excavator</i>	D8312	135,000	CY	\$20.00	\$2,700,000.00
	9	Dental concrete for fault treatment	D8312	4,200	CY	\$140.00	\$588,000.00
	10	Furnish/place zone 2 sand filter downstream of zone 1 <i>Assume a 3-ft thickness, 500' by 1000' area</i> <i>Assume same source as listed under emb.</i>	D8312	50,000	CY	\$28.00	\$1,400,000.00
	11	Furnish/place zone 3 gravel drain d/s of zone 1 <i>Assume 3-ft thickness, over zone 2 filter</i>	D8312	50,000	CY	\$25.00	\$1,250,000.00
		Consolidation Grouting of Foundation <i>Generally limited to area beneath zone 1</i>					
	12	Setups for drilling grout holes <i>Assume 2-inch dia. drilled on 10-foot centers</i>	D8312	5,000	EA	\$75.00	\$375,000.00
	13	Drill grout holes <i>Assume 2-inch dia. w/length= 30 feet</i>	D8312	150,000	LF	\$15.00	\$2,250,000.00
	14	Hookups to grout holes	D8312	5,000	EA	\$60.00	\$300,000.00
	15	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	225,000	CF	\$7.00	\$1,575,000.00
	16	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	225,000	BAGS	\$8.00	\$1,800,000.00
		Curtain Grouting of Foundation <i>Two-row curtain beneath zone 1</i>					
	17	Setups for drilling grout holes <i>Assume 2-rows of 2-inch dia. on 10-ft centers</i>	D8312	1,330	EA	\$100.00	\$133,000.00
	18	Drill grout holes <i>Assume 2-inch dia. w/length from 60 to 250 feet</i>	D8312	260,000	LF	\$15.00	\$3,900,000.00
	19	Hookups to grout holes	D8312	1,330	EA	\$75.00	\$99,750.00
	20	Pressure grout <i>Assume grouting process only minus cement</i> <i>Assume 2 CF per 1 LF of hole</i>	D8312	520,000	CF	\$7.00	\$3,640,000.00
	21	Furnish and handle cement for pressure grouting <i>Assume 1 bag per CF</i>	D8312	520,000	BAGS	\$8.00	\$4,160,000.00
		Dam 2 Subtotal					\$24,170,750.00

QUANTITIES

PRICES

BY Will Gonzales	CHECKED Bill Engemoen	BY D. Donaldson <i>DCD</i>	CHECKED BOV 8/17/04
DATE PREPARED 4/12/2004	PEER REVIEW Bill Engemoen	DATE PREPARED 08/17/04	PEER REVIEW <i>Russ 8/17/04</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 2: Central -Core Rockfill Dam

Dam2 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_D8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		<i>Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation</i>					
	22	Furnish and place zone 1 core <i>Acquired from source 6 miles from dam Compacted to 6-inch lifts by tamping roller</i>	D8312	7,500,000	CY	\$8.50	\$63,750,000.00
	23	Furnish and place zone 2 filter <i>Sand/gravel material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,170,000	CY	\$25.00	\$29,250,000.00
	24	Furnish and place zone 3 drain <i>Gravel/cobble material processed commercially or developed onsite If commercial, assume 17 mile one-way haul Compacted to 12-inch layers by vibratory steel drum</i>	D8312	1,170,000	CY	\$23.00	\$26,910,000.00
	25	Furnish and place zone 4 rockfill <i>Developed from basalt ridges surrounding reservoir Assume average 1-mile haul to dam Rock sizes up to 3-foot Compacted in 3-ft layers by vibratory steel drum</i>	D8312	41,100,000	CY	\$6.50	\$267,150,000.00
	26	Furnish and place zone 5 coarse grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of gravelly soils Compacted in 2-ft layers by vibratory steel drum</i>	D8312	13,350,000	CY	\$4.00	\$53,400,000.00
	27	Furnish and place zone 6 fine grained random fill <i>Comes from stockpiles of required excavation within 1/2 mile of dam Generally consists of sands/silts/clays Compacted to 9-inch layers by tamping rollers</i>	D8312	7,200,000	CY	\$4.50	\$32,400,000.00
		Dam 2 Subtotal					\$472,860,000.00

QUANTITIES

PRICES

BY

Will Gonzales

CHECKED

Bill Engemoen

BY

D. Donaldson

CHECKED

BAV 8/17/04

DATE PREPARED

4/12/2004

PEER REVIEW

Bill Engemoen

DATE PREPARED

08/17/04

PEER REVIEW

BAS 8/17/04

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir <i>Small Reservoir - Active Storage= 800,000 Acre-Feet</i> <i>Dam Type 3: Roller Compacted Concrete (RCC) Dam</i> Dam3 - Civil/Structural			Yakima River Basin Water Storage Options				
			REGION PN		PRICE LEVEL: Appraisal		
			FILE: C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		General Sitework					
		Clear and Grub reservoir area (not required)					
		Roads, haul roads, instrumentation, site cleanup and relandscaping included in unlisted items					
		Diversion/Dewatering during Construction					
		Assume groundwater is below excavation.					
		Assume natural stream beds in area are dry.					
		Foundation Excavation and Backfill					
		Strip topsoil and stockpile for reuse					
		Assume stockpile common material for backfill					
		Assume stockpile rock material for riprap and erosion protection					
		Assume drill and shoot rock for tunnels in ROW					
		foundation excavation					
		*** Small dam ~95% of large dam found. quantities					
		Materials for RCC					
		Assume RCC plant set up at dam site and materials trucked to the site					
		Assume concrete sand and aggregates come from Columbia or Yakima river basins and have a haul distance of 17-18 miles ave.					
		Assume cement shipped by rail to redi-mix plants that are 20 miles ave. distance from site.					
		*** RCC volume ~ 75% large dam H~90% large dam					
		Dam excavation and backfill	D8130				
	1	Strip topsoil and stockpile (1ft. Thick) (95%)		128,000	CY	\$2.00	\$256,000.00
	2	Excavate common material for dam foundation (Calc)		9,900,000	CY	\$3.50	\$34,650,000.00
	3	Excavate rock for dam foundation (95%)		99,000	CY	\$13.00	\$1,287,000.00
		Assume ~ 1% of common excavation					
	4	Excavate rock for OW on right abutment (95%)		5,000	CY	\$32.00	\$160,000.00
	5	Backfill with common material from excavation (Calc)		4,417,000	CY	\$3.50	\$15,459,500.00
		Foundation Treatment-Exc. and conc. Treatment (95%)	D8130				
	6	Extra rock excavation for fault treatment		71,000	CY	\$13.00	\$923,000.00
		Assume south abutment is fractured					
		Assume excavate with hydraulic excavator					
	7	Dental concrete for fault treatment		2,400	CY	\$150.00	\$360,000.00
	8	Dental concrete for general foundation treatment		9,500	CY	\$130.00	\$1,235,000.00
	9	Furnish and handle cement (.282T/CY)		2,700	TONS	\$120.00	\$324,000.00
		Dam 3 Subtotal					\$54,654,500.00
QUANTITIES			PRICES				
BY	Doug Stanton	CHECKED	BY	D. Donaldson	CHECKED		
DATE PREPARED	5/1/04	PEER REVIEW	DATE PREPARED	08/17/04	PEER REVIEW		

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_08MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Foundation Treatment - Consolidation grouting	D8130				
	10	Setups for drilling grout holes Assume 2-inch dia. drilled on 10-foot centers		20,700	EA	\$50.00	\$1,035,000.00
	11	Drill grout holes - 2-in. dia @ 30 ft long		621,300	LF	\$15.00	\$9,319,500.00
	12	Hookups to grout holes		20,700	EA	\$35.00	\$724,500.00
	13	Pressure grout Assume grouting process only minus cement Assume 2 CF per 1 LF of hole		1,242,600	CF	\$6.50	\$8,076,900.00
	14	Furnish and handle cement for pressure grouting Assume 1 bag per CF		1,242,000	BAGS	\$7.00	\$8,694,000.00
		Foundation Treatment-Grout Curtain thru gallery (95%)	D8130				
	15	Setups for drilling grout holes Assume 2-inch dia. Holes on 10-foot centers		640	EA	\$100.00	\$64,000.00
	16	Drill grout holes Assume 2-inch dia. w/depth ~55% avc H		161,500	LF	\$15.00	\$2,422,500.00
	17	Hookups to grout holes		640	EA	\$100.00	\$64,000.00
	18	Pressure grout Assume grouting process only minus cement Assume 2 CF per 1 LF of hole		323,000	CF	\$7.00	\$2,261,000.00
	19	Furnish and handle cement for pressure grouting Assume 1 bag per CF		323,000	BAGS	\$8.00	\$2,584,000.00
	20	R&I 4-inch dia. steel pipe nipples (assume 4'/drain)		2,600	LF	\$60.00	\$156,000.00
		Leveling Concrete for Foundation (95%)	D8130				
	21	Assume 6 sack mix, 3-foot thick over footprint		254,000	CY	\$200.00	\$50,800,000.00
	22	Furnish and handle cement (.282T/CY)		71,600	TONS	\$100.00	\$7,160,000.00
		Drill foundation drains from gallery (95%)	D8130				
	23	Setups (assume 10-ft centers)		665	EA	\$100.00	\$66,500.00
	24	Drill holes Assume 4-inch dia. w/length= 33% dam height.		166,000	LF	\$15.00	\$2,490,000.00
		Drill formed drains in dam body along U/S face (95%)	D8130				
		Assume 10-ft ctrs and 6-inch dia.					
	25	Lower gallery - Setups		420	EA	\$100.00	\$42,000.00
	26	Lower gallery - Holes drilled from gallery upward		89,800	LF	\$15.00	\$1,347,000.00
	27	Upper gallery - Setups		635	EA	\$100.00	\$63,500.00
	28	Upper gallery - holes drilled from dam crest to gallery		135,000	LF	\$15.00	\$2,025,000.00
		Dam 3 Subtotal					\$99,395,400.00

QUANTITIES

PRICES

BY Doug Stanton <i>DS</i>	CHECKED <i>GB</i>	BY D. Donaldson <i>DD</i>	CHECKED BAV 8/17/04
DATE PREPARED 5/1/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>WAB</i> 8/17/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\livanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct RCC Dam	D8130				
		Assume 275 lb/CY cementitious material					
		Assume 40% fly ash and 60% cement					
		Assume aggregate processed and hauled 15-20 miles					
		Assume cement hauled 20-25 miles					
	29	Construct RCC test section (same as Large dam)		4,100	CY	\$140.00	\$574,000.00
		Estimated dimensions = 100' x 35' x 30'					
		Assume convent. Conc. Facing elements					
		Assume incorporated into thrust block for stilling basin and control house					
		Includes gallery forming, waterstops, Contraction joint, facing elements, bonding mortar (no grouting)					
	30	Construct RCC Dam (Complete in Place) (Calc)		16,658,000	CY	\$28.00	\$466,424,000.00
	30A	Furnish and handle cement (.138T/CY)		2,290,500	TONS	\$90.00	\$206,145,000.00
	31	Bonding Mortar (Assume 1/2-inch thick/lift on all lifts)(75%)		731,250	CY	\$70.00	\$51,187,500.00
		Cast-in-place Conventional Concrete (90%)	D8130				
	32	Facing elements - slipformed on U/S face		180,000	CY	\$100.00	\$18,000,000.00
	33	Facing elements - slabs on D/S face		219,600	CY	\$100.00	\$21,960,000.00
	34	Furnish and handle cement (.282T/CY)		112,700	TONS	\$100.00	\$11,270,000.00
	35	FRP Reinforced concrete dam crest		10,100	CY	\$250.00	\$2,525,000.00
	36	Assume 1.5 foot thick (160 lbs/CY)		1,616,000	LBS	\$0.80	\$1,292,800.00
	37	Furnish and handle cement (.282T/CY)		2,800	TONS	\$120.00	\$336,000.00
	38	FRP Reinforced concrete parapets on dam crest		2,300	CY	\$400.00	\$920,000.00
		Estimated 6,000 on both u/s and d/s sides					
	39	F & P reinforcement (160 lbs/CY)		368,000	LBS	\$0.80	\$294,400.00
	40	Furnish and handle cement (.282T/CY)		650	TONS	\$120.00	\$78,000.00
		Dam 3 Subtotal					\$781,006,700.00

QUANTITIES

PRICES

BY

Doug Stanton

CHECKED

BY

D. Donaldson

CHECKED

6/17/04

DATE PREPARED

5/1/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

2/28/04

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 3: Roller Compacted Concrete (RCC) Dam

Dam3 - Civil/Structural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct RCC Dam (continued)	D8130				
	41	Form lower drain/grout gallery/adits within RCC section Assume 6-ft wide x 10-ft high across base of dam Assume Symons Panel system for 12" RCC lifts Assume ~90% large dam quantity		6,300	LF	\$50.00	\$315,000.00
	42	Form upper drainage gallery/adits within RCC section Assume 6-ft wide x 10-ft high across base of dam Assume Symons Panel system for 12" RCC lifts Assume ~90% large dam quantity		4,300	LF	\$50.00	\$215,000.00
	43	F&I 12-in PVC waterstops for u/s CrJs & facing elements Assume 135 CrJs @ 50-ft centers (90%)		107,000	LF	\$15.00	\$1,605,000.00
	44	F&I Crack inducers @ CrJs in facing elements (Assume 1/2 L of waterstops and 6 ft wide) (90%) Similar to Milltown Hill		53,600	LF	\$15.00	\$804,000.00
	45	F&I Metal crack inducer plates for CrJs in RCC (75%) Assume placed every other lift Similar to Pueblo Dam		4,190,000	LF	\$8.00	\$33,520,000.00
		Abutment Adits (same as large dam)	D8130				
	46	Drill and shoot 16-ft Dia. for adit		1,100	LF	\$2,500.00	\$2,750,000.00
	47	Remove and stockpile rock (assume local stockpile)		15,500	CY	\$20.00	\$310,000.00
	48	Furnish and install 2500-10-ft long x 1-inch dia. A307, 20K rockbolts		12,500	LF	\$60.00	\$750,000.00
	49	Furnish and install steel sets (W8 x 48) in crown		200,000	LBS	\$4.00	\$800,000.00
	50	FF & P concrete in adits (6' x 10')		7,300	CY	\$350.00	\$2,555,000.00
	51	Furnish and handle cement (.282T/CY)		2,100	TONS	\$120.00	\$252,000.00
		Grout adits (same as large dam)	D8130				
	52	Setups for drilling grout holes (2-in dia holes, 10 ft ctrs, and 8 holes per ring)		880	EA	\$100.00	\$88,000.00
	53	Drill grout holes (2-in dia and L=30 ft)		26,400	LF	\$20.00	\$528,000.00
	54	Hookups to grout holes		880	EA	\$100.00	\$88,000.00
	55	Pressure grout (grouting process only minus cement) Assume 2 CF per 1 LF of hole		52,800	CF	\$8.00	\$422,400.00
	56	Furnish and handle cement for pressure grouting Assume 1 bag per CF		52,800	BAGS	\$10.00	\$528,000.00
		Dam 3 Subtotal					\$45,530,400.00

QUANTITIES

PRICES

BY Doug Stanton	CHECKED <i>[Signature]</i>	BY D. Donaldson	CHECKED <i>[Signature]</i>
DATE PREPARED 5/1/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>[Signature]</i>

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Dam Type 3: Roller Compacted Concrete (RCC) Dam

REGION

PRICE LEVEL:

FILE:

C:\Documents and Settings\byvannote\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

Dam3 - Miscellaneous

[illegible]

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Dam and Reservoir Small Reservoir - Active Storage= 800,000 Acre-Feet River Outlet Works for Rockfill Dams			Yakima River Basin Water Storage Options				
ROW1 - Civil/Structural, Mechanical, and Electrical			REGION PN		PRICE LEVEL:		Appraisal
FILE:			C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		River Outlet Works for 0.8 MAF Option will be slightly smaller than outlet works sized for the 1.3MAF Option.					
	1	ROW1 for Rockfill Dams (Complete and Inplace) Assume cost is 95% (+/-) cost for 1.3 MAF Option	D8130	1	LS	\$79,000,000.00	\$79,000,000.00
		1.3MAF (ROW1) Subtotal: \$83,494,115.00					
		% of subtotal 0.95					
		Result (95% of subtotal): \$79,319,409.25					
		Round (+/-) \$79,000,000.00					
QUANTITIES			PRICES				
BY Doug Stanton <i>DS</i>			CHECKED <i>BAR</i>		BY D. Donaldson <i>DD</i>		
DATE PREPARED 5/1/04			PEER REVIEW		CHECKED <i>SDV</i> 8/17/04		
					DATE PREPARED 08/17/04		
					PEER REVIEW <i>2nd</i> 8/17/04		

ESTIMATE WORKSHEET

[illegible]

ESTIMATE WORKSHEET

FEATURE:

Black Rock Dam and Reservoir

Small Reservoir - Active Storage= 800,000 Acre-Feet

Relocation of State Highway 24

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock
Revisions\Black Rock Dam_0.8MAF Rev 1.xls\Summary

SH24 - Civil

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		State Highway Relocation (11.8 miles)					
	1	Clear roadway alignment	D8140	280	AC	\$3,000.00	\$840,000.00
	2	Excavation from borrow	D8140	1,000,000	CY	\$3.50	\$3,500,000.00
	3	Excavation for roadway (assume 70% rock material)	D8140	5,200,000	CY	\$5.50	\$28,600,000.00
	4	Compacting roadway embankments (subbase)	D8140	5,900,000	CY	\$1.50	\$8,850,000.00
	5	Furnish and place base course material	D8140	150,000	TONS	\$16.00	\$2,400,000.00
	6	Furnish and place asphalt concrete	D8140	97,000	TONS	\$60.00	\$5,820,000.00
	7	Furnish and install W-beam type guardrail	D8140	58,000	LF	\$30.00	\$1,740,000.00
	8	Furnish and install miscellaneous pipe culverts Assume 60-inch-diameter, wt/ft=100 lbs/ft.	D8140	1,800	LF	\$200.00	\$360,000.00
		Utility Relocations within Reservoir Inundation					
	9	Remove Existing Transmission Lines Two 115-kV H-frame wood-pole lines, 60-feet apart 954 AWG conductor	D8440	7	miles	\$50,000.00	\$350,000.00
	10	Construct Transmission Lines Two 115-kV H-frame wood-pole lines, 60-feet apart 954 AWG conductor	D8440	12	miles	\$375,000.00	\$4,500,000.00
	11	Install new buried fiber optic line along new SH24 ROW Assume abandon existing line.	D-8120	12	miles	\$30,000.00	\$360,000.00
		SH24 Subtotal					\$57,320,000.00

QUANTITIES

PRICES

BY

Anne Pavol

CHECKED

Chou Cho

BY

D. Donaldson

DeD

CHECKED

cov 8/7/04

DATE PREPARED

4/24/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

Ras 8/17/04

**Black Rock Outlet Facility
and Outflow Conveyance**

$Q_{(\text{Conveyance})} = 2,500 \text{ cfs}$

$Q_{(\text{Power Plant})} = 1,500 \text{ cfs}$

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study
 Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 1,500 cfs
 Summary

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\ivanotte\Desktop\Black Rock\Black Rock
 Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Roza Outflow Conveyance System sized for 2,500 cfs. Roza Canal Powerplant sized for 1,500 cfs. Assumes full Q goes through Powerplant. Sunnyside Deliveries by Canal Option. Roza North Deliveries by Pumping Plant.					
		Black Rock Outflow Conveyance Subtotal					\$306,402,600.00 ✓
		Plant - Civil and Structural Subtotal					\$21,069,650.00 ✓
		Plant - Mechanical Subtotal					\$77,995,800.00 ✓
		Plant - Electrical Subtotal					\$4,071,085.00 ✓
		Switchyard & Transmission Line Subtotal					\$874,000.00 ✓
		Subtotal					\$410,413,135.00 ✓
		Mobilization +/- 5%					\$21,000,000.00 ✓
		Subtotal w/ mobilization					\$431,413,135.00 ✓
		Unlisted Items +/- 10%					\$38,586,865.00 ✓
		CONTRACT COST					\$470,000,000.00 ✓
		Contingencies +/- 25%					\$120,000,000.00 ✓
		FIELD COST					\$590,000,000.00 ✓
QUANTITIES			PRICES				
BY	CHECKED		BY	D. Donaldson <i>DD</i> Elizabeth Tran		CHECKED	<i>GPV</i> 8/17/04
DATE PREPARED	PEER REVIEW		DATE PREPARED	08/17/04		PEER REVIEW	<i>7</i>

ESTIMATE WORKSHEET

[illegible]

ESTIMATE WORKSHEET

[illegible]

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q=1,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\mvanotte\Desktop\Black Rock\Black Rock
 Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

Black Rock Outflow Conveyance

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Tunnel					
		Construct 90,000-ft long, 17.00-ft finished diameter, 19.67-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has three final support reaches.					
		80,600-ft long unreinforced concrete lined reach					
	9	Excavation (907,000 cy, appr 11 cy/lf)	D-8140	80,600	lf	\$1,200.00	\$96,720,000.00
	10	Furnish and place unreinforced concrete tunnel lining	D-8140	229,000	cy	\$350.00	\$80,150,000.00
	11	Cementitious materials for concrete tunnel lining	D-8140	64,600	tons	\$100.00	\$6,460,000.00
	12	Furnish & install 3/4-in dia, 8-ft long rock bolts	D-8140	642,000	lin ft	\$55.00	\$35,310,000.00
		2,000-ft long reinforced concrete lined reach					
	13	Excavation (22,500 cy, appr 11 cy/lf)	D-8140	2,000	lf	\$1,200.00	\$2,400,000.00
	14	Furnish and place reinforced concrete tunnel lining	D-8140	5,690	cy	\$350.00	\$1,991,500.00
	15	Cementitious materials for concrete tunnel lining	D-8140	1,600	tons	\$130.00	\$208,000.00
	16	Furnish and install concrete reinforcement	D-8140	81,700	lbs	\$1.00	\$81,700.00
	17	Furnish and install structural steel tunnel supports	D-8140	828,000	lbs	\$4.00	\$3,312,000.00
		7,400-ft long steel lined portal reach					
	18	Excavation (83,300 cy, appr 11 cy/lf)	D-8140	7,400	lf	\$1,200.00	\$8,880,000.00
		Steel Tunnel Liner:					
		ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi					
	19	204" Dia., 7/8" wall, L= 7770 ft., 1916 lbs/ft	D-8420	19,200,000	LBS	\$2.00	\$38,400,000.00
	20	Furnish and place backfill concrete	D-8140	21,100	cy	\$300.00	\$6,330,000.00
	21	Cementitious materials for backfill concrete	D-8140	5,940	tons	\$120.00	\$712,800.00
	22	Furnish & install 3/4-in dia, 8-ft long rock bolts	D-8140	89,600	lin ft	\$55.00	\$4,928,000.00
	23	Furnish and install structural steel tunnel supports	D-8140	415,000	lbs	\$4.00	\$1,660,000.00
		Sheet Subtotal					\$287,544,000.00

QUANTITIES

PRICES

BY	Bill Thompson (D-8140) Nathan Nakamoto (D-8420)	CHECKED	NA (D-8140) Rick Frisz, D8420	BY	D. Donaldson <i>DD</i>	CHECKED	BOU 8/17/04
DATE PREPARED	5/26/04	PEER REVIEW		DATE PREPARED	08/17/04	PEER REVIEW	<i>g</i>

ESTIMATE WORKSHEET

FEATURE:				PROJECT:					
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q=1,500 cfs Black Rock Outflow Conveyance				Yakima River Basin Water Storage Options					
				REGION	PN	PRICE LEVEL:	Appraisal		
				FILE:	Settings\lvannotte\	ments and	Settings\lvannotte\Des		
PLAN	AL	T	AC	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
				Construct Surge Shaft					
				Construct 530-ft deep, 40.0-ft finished diameter, 46-ft excavated diameter, shaft in rock. Shaft will be excavated by raise bore and slash method (drill & blast). Water problems will be minimal. Shaft has two final support reaches.					
				430-ft deep unreinforced concrete lined reach					
		24		Excavation	D-8140	430	lf	\$17,000.00	\$7,310,000.00
				(26,500 cy, approx. 62 cy/lf)					
		25		Furnish and place unreinforced concrete shaft lining	D-8140	6,450	cy	\$400.00	\$2,580,000.00
		26		Cementitious materials for concrete shaft lining	D-8140	1,820	tons	\$130.00	\$236,600.00
		27		Furnish & install 1-in dia, 12-ft long rock bolts	D-8140	21,000	lin ft	\$60.00	\$1,260,000.00
				100-ft deep reinforced concrete lined shaft top reach					
		28		Excavation	D-8140	100	lf	\$17,000.00	\$1,700,000.00
				(6,160 cy, approx. 62 cy/lf)					
		29		Furnish and place reinforced concrete shaft lining	D-8140	1,500	cy	\$400.00	\$600,000.00
		30		Cementitious materials for concrete shaft lining	D-8140	423	tons	\$150.00	\$63,450.00
		31		Furnish and install concrete reinforcement	D-8140	18,700	lin ft	\$1.00	\$18,700.00
		32		Furnish & install 1-in dia, 12-ft long rock bolts	D-8140	4,800	lin ft	\$60.00	\$288,000.00
		33		Furnish and install chain link protection	D-8140	76,600	sq yd	\$20.00	\$1,532,000.00
				Black Rock Outflow Conveyance Subtotal					\$306,402,600.00

QUANTITIES

PRICES

BY Bill Thompson	CHECKED <i>JA</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>BDV 8/17/04</i>
DATE PREPARED 4/19/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>y</i>

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q=1,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock
 Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

Civil/Site

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Tailrace Channel Excavation					
		T.O Ground El. 1176. Assume T.O. Rock El. 1150					
		Assume stockpile rock and common material for reuse.					
	15	Common excavation for tailrace channel	D8120	44,500	CY	\$5.00	\$222,500.00
	16	Rock excavation for tailrace channel (drill and shoot)	D8120	25,000	CY	\$32.00	\$800,000.00
		Structural Excavation and Backfill (Powerplant & Bypass)					
		T.O Ground El. 1176. Assume T.O. Rock El. 1150					
		Assume stockpile rock for later use as riprap.					
	17	Common excavation for structures	D8120	24,700	CY	\$12.00	\$296,400.00
	18	Rock excavation for structures (drill & shoot)	D8120	22,000	CY	\$32.00	\$704,000.00
	19	Furnish backfill for structures (reuse excavation)	D8120	6,400	CY	\$6.00	\$38,400.00
	20	Place backfill around structures	D8120	6,400	CY	Included above	
	21	Compact backfill around structures	D8120	6,400	CY	\$8.00	\$51,200.00
		Pipe Trench Excavation and Backfill					
		Manifold excavation in yard.					
		T.O Ground El. 1176. Assume T.O. Rock El. 1150					
	22	Common excavation for pipe in Service Yard	D8120	18,000	CY	\$10.00	\$180,000.00
	24	Furnish, place, & compact backfill for pipe (local)	D8120	11,500	CY	\$6.00	\$69,000.00
		Pipe Trench Excavation and Backfill					
		From Tunnel Portal (Sta. 910+00) to Yard (Sta. 940+00)					
		Assume all common excavation					
	25	Common excavation for pipe	D8140	487,000	CY	\$5.00	\$2,435,000.00
	26	Furnish backfill for pipe	D8140	461,500	CY	Included above	
	27	Place backfill around pipe	D8140	461,500	CY	\$3.00	\$1,384,500.00
	28	Compact pipe backfill (F&P included in above items)	D8140	36,000	CY	\$3.00	\$108,000.00
		Sheet Subtotal					\$6,289,000.00

QUANTITIES

PRICES

BY	Dick LaFond (D8120)	CHECKED	<i>M.R. O'Shea (D-8120)</i>	BY	D. Donaldson	CHECKED	
	Linda Bowles (D8140)				<i>DEC</i>		<i>DOV 8/17/04</i>
DATE PREPARED	6/4/04	PEER REVIEW		DATE PREPARED	08/17/04	PEER REVIEW	<i>g</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q=1,500 cfs			Yakima River Basin Water Storage Options				
Structural and Architectural			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\svanotte\Desktop\Black Rock\Black Rock Revisions\QBR_Roza PP_1500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Concrete Tailrace Lining and Retaining Walls					
		Assume lining is 1-foot thick w/ #6@12" EW EF, 1.5:1 side slopes					
	29	Furnish, form, and place reinforced concrete lining in excavated channel (F _c = 4 ksi)	D8120	2,100	CY	\$400.00	\$840,000.00
	30	Furnish, form, and place reinforced concrete walls	D8120	1,800	CY	\$400.00	\$720,000.00
	31	Furnish and place concrete reinforcement. Assume 130 #/CY	D8120	500,000	LBS	\$0.80	\$400,000.00
	32	Furnish and handle cement (.282T/CY)	D8120	1,085	TONS	\$140.00	\$151,900.00
		Construct Powerplant and Bypass Substructure					
	33	Furnish, form, and place reinforced concrete	D8120	15,500	CY	\$350.00	\$5,425,000.00
	34	Furnish and place concrete reinforcement. Assume 120 #/CY	D8120	1,860,000	LBS	\$0.65	\$1,209,000.00
	35	Furnish and handle cement (.282T/CY)	D8120	4,370	TONS	\$120.00	\$524,400.00
	36	Construct Powerplant and Bypass Superstructure 212.5-ft x 73.5-ft x 42-ft high superstructure Structural steel superstructure with CMU walls. Stepped columns for 90T crane support Built-up roof on metal roof deck.	D8120	15,620	SF	\$100.00	\$1,562,000.00
		Sheet Subtotal					\$10,832,300.00
QUANTITIES			PRICES				
BY	Dick LaFond	CHECKED	M. R. O'Shea		BY	D. Donaldson	CHECKED
DATE PREPARED	6/4/04	PEER REVIEW			DATE PREPARED	08/17/04	PEER REVIEW

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q=1,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
 Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

Structural and Architectural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL (cont.)					
		Construct Pipe Encasements in Yard					
	37	Furnish, form, and place reinforced concrete	D8120	3,100	CY	\$400.00	\$1,240,000.00
	38	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	341,000	LBS	\$0.80	\$272,800.00
	39	Furnish and handle cement (.282T/CY)	D8120	874	TONS	\$140.00	\$122,360.00
		Structural Steel					
	40	Furnish and install structural steel (painted): Includes crane girder, rail, and monorail support frames. Does not include typ. building framework.	D8120	175,000	LBS	\$4.00	\$700,000.00
		Miscellaneous Metalwork					
	41	Furnish and install miscellaneous metalwork Includes grating, hatches, ladders, guardrail, and cable trays	D8120	45,000	LBS	\$7.00	\$315,000.00
	42	Motor-operated, exterior insulated roll-up door 18' x 20'	D8120	1	EA	\$10,000.00	\$10,000.00
		Plant - Civil and Structural Subtotal					\$21,069,650.00

QUANTITIES**PRICES**

BY Dick LaFond	CHECKED <i>M. R. O'Shea</i>	BY D. Donaldson <i>DCD</i>	CHECKED <i>bnv 8/17/04</i>
DATE PREPARED 6/5/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

ESTIMATE WORKSHEET

[illegible]

ESTIMATE WORKSHEET

FEATURE: Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q=1,500 cfs Mechanical			PROJECT: Yakima River Basin Water Storage Options <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">REGION</td> <td style="width: 20%;">PN</td> <td style="width: 20%;">PRICE LEVEL:</td> <td colspan="2">Appraisal</td> </tr> </table> FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\BR_Roza PP_1500 Rev 1.xls\Summary					REGION	PN	PRICE LEVEL:	Appraisal	
REGION	PN	PRICE LEVEL:	Appraisal									
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT					
		Furnish and install the following:										
		Steel Penstock:										
		Steel plate used for pipe fabrication:										
		ASTM A36: Sy = 36 kpsi										
		(All pipe sizes are inside diameters)										
	4	204" Dia., 1 15/16" wall, L= 4,993 ft., 4265 lbs/ft		21,300,000	LBS	\$2.00	\$42,600,000.00					
	5	84" Dia., 13/16" wall, L= 492 ft., 737 lbs/ft		363,000	LBS	\$2.00	\$726,000.00					
		Stainless Steel Stilling Basin for Sleeve Valves:										
		ASTM 316L Stainless steel plate										
	6	Four - 396" Dia., 1 1/4" wall cylindrical tanks with baseplates: Each tank height = 20 feet Total weight for four tanks = 1,180,000 lbs.	D8420	1,180,000	LBS	\$15.00	\$17,700,000.00					
		Sleeve valves with hydraulic operators:										
	7	Four - 84" Dia. Inlet X 72" Dia. Outlet Valves ASTM 316L Stainless steel plate Each valve weight = 70,000 Total weight for four valves = 280,000 lbs.	D8420	280,000	LBS	\$15.00	\$4,200,000.00					
		Spherical valves with hydraulic operators:										
	8	Sleeve valve guard valves Four - 60" Dia. Spherical valves with hydraulic operators 60,000 lbs. per valve	D8420	240,000	LBS	\$10.00	\$2,400,000.00					
	9	Turbine guard valve One - 108" Dia. Spherical valve with hydraulic operator 180,000 lbs. per valve	D8420	180,000	LBS	\$10.00	\$1,800,000.00					
		Sheet Subtotal					\$69,426,000.00					
QUANTITIES			PRICES									
BY Nathan Nakamoto, D8420		CHECKED Rick Frisz, D8420	BY D. Donaldson		CHECKED BOJ 8/17/04							
DATE PREPARED 5/26/04			DATE PREPARED 08/17/04		PEER REVIEW g							

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q=1,500 cfs Mechanical			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\byvanotte\Desktop\Black Rock\Black Rock Revisions\BR_Roza PP_1500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	10	Furnishing and installing one 90-Ton overhead crane, 67.5' span	D-8410	157,500	LBS	\$6.00	\$945,000.00
	11	Furnishing and installing Hydraulic elevator capacity = 3500 pounds, travel = 31 ft. landings = 3, speed = 100 ft/min.	D-8410	1	unit	\$400,000.00	\$400,000.00
	12	Bulkhead gates and guides at turbine (steel) (assumes 3 bays of guides and 3 bulkhead gates)	D-8410	31,000	LBS	\$4.00	\$124,000.00
	13	Monorail hoist for bulkhead gate, electric wire rope, motorized trolley, 5-ton capacity	D-8410	1,500	LBS	\$20.00	\$30,000.00
	14	Stoplogs, lifting beam & guides at sleeve valves eight bays fo guides, 2 bays of stoplogs (steel)	D-8410	152,000	LBS	\$4.00	\$608,000.00
	15	CO2 High Pressure Fire Extinguishing System: 12 - 100# Storage Cylinders w/ control panel and appurtenances and 400 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$36,000.00
	16	Fire Suppression System: 3 Fire hose reels w/ 100 feet of hose 12 - Portable hand-held 20# extinguishers 2,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$50,000.00
	17	Unit Cooling Water System: 2 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 1,000 lbs. of type K copper tubing, valves & fittings 4,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$130,000.00
	18	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 1,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$20,000.00
Sheet Subtotal							\$2,343,000.00
QUANTITIES			PRICES				
BY R Christensen, B Sond C Berte, J Grass		CHECKED <i>AMR</i>	BY D. Donaldson <i>DD</i>		CHECKED <i>bvd 8/17/04</i>		
DATE PREPARED 5/3/2004		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW <i>y</i>		

PROJECT:

Roza Canal Powerplant, Bypass, and Switchyard
Outflow Conveyance System - $Q = 2,500$ cfs
Powerplant Design Flow - $Q = 1,500$ cfs

Yakima River Basin Water Storage Options

REGION	PN	PRICE LEVEL:	Appraisal
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FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

Mechanical

[illegible]

QUANTITIES

PRICES

BY

J Grass

CHECKED

AME

BY

D. Donaldson

CHECKED

BoV 8/17/04

DATE PREPARED

5/27/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

9

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q=1,500 cfs			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\shvanotte\Desktop\Black Rock\Black Rock Revisions\BR_Roza PP_1500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Electrical Generator (F&I) 25,000 kVA, 6,900 volts, 3-phase, 60 Hz 276.9 rpm, 95 % power factor Vertical, synchronous machine Static excitation system & voltage regulator	D8430	1	EA	\$1,550,000	\$1,550,000.00
	2	Plant Grounding System (F&I) Ground rods, 10 ft, 3/4" dia, copper-clad Stranded bare-copper conductor:	D8430	30	EA	\$180.00	\$5,400.00
	3	250 MCM		1,200	LF	\$5.50	\$6,600.00
	4	4/0 AWG		800	LF	\$4.00	\$3,200.00
	5	2/0 AWG		500	LF	\$3.50	\$1,750.00
	6	4 AWG		800	LF	\$2.50	\$2,000.00
	7	Generator Bus & Metal-Enclosed Switchgear (F&I) Generator non-segregated phase bus: 15 kV, 3000 amperes, 3-phase, 60 Hz	D8430	250	LF	\$1,400.00	\$350,000.00
	8	Generator power circuit breaker: 15 kV, 3000 amperes, 3-phase, vacuum type		1	EA	\$730,000	\$730,000.00
	9	Station-service fused interrupter switch: 15 kV, 600 ampere, 3-phase, w/ power fuses		1	EA	\$30,000.00	\$30,000.00
	10	Generator Control Equipment (F&I) Duplex control switchboard for operation of the generator	D8430	1	EA	\$730,000	\$730,000.00
		Sheet Subtotal					\$3,408,950.00
QUANTITIES			PRICES				
BY	M. Schuh	CHECKED	L Rom'		BY	Elizabeth Tran	CHECKED
	D8430						SDV 8/17/04
DATE PREPARED	5/27/04	PEER REVIEW			DATE PREPARED	08/17/04	PEER REVIEW

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q=1,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Electrical

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Plant Battery System (F&I)	D8430				
	11	125 volt, 300 ampere-hour, lead-acid battery		1	EA	\$25,000.00	\$25,000.00
	12	Battery chargers		2	EA	\$8,000.00	\$16,000.00
	13	DC distribution panelboard, 100 ampere mains, and molded-case circuit breakers		1	EA	\$12,500.00	\$12,500.00
		Plant Station-Service Equipment (F&I)	D8430				
		Indoor secondary unit substation with following features:					
	14	Dry-type transformer, 6.9 kV-480Y/277, 1500 kVA		1	EA	\$55,000.00	\$55,000.00
	15	480 volt power-circuit breakers, 600 amperes		5	EA	\$4,000.00	\$20,000.00
		Building Lighting System (F&I)	D8430				
		Interior luminaires					
	16	High bay, high-pressure sodium, 400 Watt 480 volt, 1-phase		24	EA	\$700.00	\$16,800.00
	17	4 foot fluorescent lighting fixtures, 2 lamps		36	EA	\$220.00	\$7,920.00
	18	Emergency lighting system		1	LS	\$900.00	\$900.00
		Exterior luminaires					
	19	High-pressure sodium, wall-mounted, outdoor type 70 watt, 120 volt		12	EA	\$400.00	\$4,800.00
	20	Building Fire Detection & Alarm System (F&I)	D8430	1	LS	\$150,000	\$150,000.00
		Distribution Panelboards (F&I)	D8430				
	21	480-volts, 3-phase, 400 ampere bus, indoor type with 12 molded-case circuit breakers		2	EA	\$30,000.00	\$60,000.00
		Motor Control Center (F&I)	D8430				
	22	480 volts, 3-phase, 1600 ampere main bus Six 20 inch wide sections		1	EA	\$195,000	\$195,000.00
		Sheet Subtotal					\$563,920.00

QUANTITIES

PRICES

BY M. Schuh D8430	CHECKED <i>L Romi</i>	BY <i>Red For</i> Elizabeth Tran	CHECKED <i>BAV 8/17/04</i>
DATE PREPARED 5/27/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q=1,500 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\BR_Roza PP_1500 Rev 1.xls\Summary

Switchyard and Transmission Line

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Switchyard					
		Furnish and Install:					
	1	Oil-filled power transformer 25 MVA; 34.5-6.9kV, 3-phase	D8440	1	EA	\$450,000	\$450,000.00
	2	F&I 34.5-KV PRIMARY UNIT SUBSTATION: 'INCOMING 34.5KV SECTION/BUS/INTERRUPTER 'OUTGOING 6.9KV SECTION/BUS/INTERRUPTER 'SURGE ARRESTORS, 30KV	D8440	1	EA	\$375,000	\$375,000.00
		Tap at existing 34.5-kV line					
		Furnish and Install:					
	3	Wood-pole tap structure	D8440	1	EA	\$9,000.00	\$9,000.00
	4	Construct Transmission Line Assume 1000 feet of transmission line from existing 34.5-kV line wood poles, 1115 AWG conductor	D8440	1,000	FT	\$40.00	\$40,000.00
		Switchyard & Transmission Line Subtotal					\$874,000.00

QUANTITIES

PRICES

BY

L. Gamuciello

CHECKED

PEER REVIEW

James R. Zeiger

BY

Doc for
 Elizabeth Tran

DATE PREPARED

08/17/04

CHECKED

BOV 8/17/04

PEER REVIEW

g

5/27/04

**Black Rock Outlet Facility
and Outflow Conveyance**

$$Q_{(\text{Conveyance})} = 2,500 \text{ cfs}$$

$$Q_{(\text{Power Plant})} = 900 \text{ cfs}$$

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study
 Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs
 Summary

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\BR_SunnysidePP_1 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Roza Outflow Conveyance System sized for 2,500 cfs.					
		Roza Canal Powerplant sized for 900 cfs.					
		Assumes Roza South Q goes through Powerplant.					
		Sunnyside Deliveries by Pressure Pipe Option.					
		Roza North Deliveries by Pressure Pipe Option.					
		Black Rock Outflow Conveyance Subtotal					\$306,402,600.00 ✓
		Plant - Civil and Structural Subtotal					\$19,925,100.00 ✓
		Plant - Mechanical Subtotal					\$77,295,800.00 ✓
		Plant - Electrical Subtotal					\$4,071,085.00 ✓
		Switchyard & Transmission Line Subtotal					\$874,000.00 ✓
		Subtotal					\$408,568,585.00 ✓
		Mobilization +/- 5%					\$20,000,000.00 ✓
		Subtotal w/ mobilization					\$428,568,585.00 ✓
		Unlisted Items +/- 10%					\$41,431,415.00 ✓
		CONTRACT COST					\$470,000,000.00 ✓
		Contingencies +/- 25%					\$120,000,000.00 ✓
		FIELD COST					\$590,000,000.00 ✓

QUANTITIES**PRICES**

BY	CHECKED	BY D. Donaldson <i>DD</i>	CHECKED <i>DDV 8/17/04</i>
DATE PREPARED	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q= 900 cfs			Yakima River Basin Water Storage Options				
Black Rock Outflow Conveyance			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\brvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Tunnel					
		Construct 90,000-ft long, 17.00-ft finished diameter, 19.67-ft minimum bore diameter, tunnel in rock. Tunnel will be excavated with TBM and driven uphill. Water problems will be minimal. Tunnel has three final support reaches.					
		80,600-ft long unreinforced concrete lined reach					
	9	Excavation (907,000 cy, appr 11 cy/lf)	D-8140	80,600	lf	\$1,200.00	\$96,720,000.00
	10	Furnish and place unreinforced concrete tunnel lining	D-8140	229,000	cy	\$350.00	\$80,150,000.00
	11	Cementitious materials for concrete tunnel lining	D-8140	64,600	tons	\$100.00	\$6,460,000.00
	12	Furnish & install 3/4-in dia, 8-ft long rock bolts	D-8140	642,000	lin ft	\$55.00	\$35,310,000.00
		2,000-ft long reinforced concrete lined reach					
	13	Excavation (22,500 cy, appr 11 cy/lf)	D-8140	2,000	lf	\$1,200.00	\$2,400,000.00
	14	Furnish and place reinforced concrete tunnel lining	D-8140	5,690	cy	\$350.00	\$1,991,500.00
	15	Cementitious materials for concrete tunnel lining	D-8140	1,600	tons	\$130.00	\$208,000.00
	16	Furnish and install concrete reinforcement	D-8140	81,700	lbs	\$1.00	\$81,700.00
	17	Furnish and install structural steel tunnel supports	D-8140	828,000	lbs	\$4.00	\$3,312,000.00
		7,400-ft long steel lined portal reach					
	18	Excavation (83,300 cy, appr 11 cy/lf)	D-8140	7,400	lf	\$1,200.00	\$8,880,000.00
		Steel Tunnel Liner:					
	19	ASTM A572 Gr. 50: Sy = 50 kpsi St = 65 kpsi 204" Dia., 7/8" wall, L= 7770 ft., 1916 lbs/ft	D-8420	19,200,000	LBS	\$2.00	\$38,400,000.00
	20	Furnish and place backfill concrete	D-8140	21,100	cy	\$300.00	\$6,330,000.00
	21	Cementitious materials for backfill concrete	D-8140	5,940	tons	\$120.00	\$712,800.00
	22	Furnish & install 3/4-in dia, 8-ft long rock bolts	D-8140	89,600	lin ft	\$55.00	\$4,928,000.00
	23	Furnish and install structural steel tunnel supports	D-8140	415,000	lbs	\$4.00	\$1,660,000.00
		Sheet Subtotal					\$287,544,000.00
QUANTITIES			PRICES				
BY	Bill Thompson (D-8140) Nathan Nakamoto (D-8420)		CHECKED	RA (D-8140) Rick Frisz, D8420		BY	D. Donaldson <i>Red</i>
DATE PREPARED	5/26/04		PEER REVIEW			DATE PREPARED	08/17/04
						PEER REVIEW	<i>g</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q= 900 cfs			Yakima River Basin Water Storage Options				
Black Rock Outflow Conveyance			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Surge Shaft					
		Construct 530-ft deep, 40.0-ft finished diameter, 46-ft excavated diameter, shaft in rock. Shaft will be excavated by raise bore and slash method (drill & blast). Water problems will be minimal. Shaft has two final support reaches.					
		430-ft deep unreinforced concrete lined reach					
	24	Excavation (26,500 cy, approx. 62 cy/lf)	D-8140	430	lf	\$17,000.00	\$7,310,000.00
	25	Furnish and place unreinforced concrete shaft lining	D-8140	6,450	cy	\$400.00	\$2,580,000.00
	26	Cementitious materials for concrete shaft lining	D-8140	1,820	tons	\$130.00	\$236,600.00
	27	Furnish & install 1-in dia, 12-ft long rock bolts	D-8140	21,000	lin ft	\$60.00	\$1,260,000.00
		100-ft deep reinforced concrete lined shaft top reach					
	28	Excavation (6,160 cy, approx. 62 cy/lf)	D-8140	100	lf	\$17,000.00	\$1,700,000.00
	29	Furnish and place reinforced concrete shaft lining	D-8140	1,500	cy	\$400.00	\$600,000.00
	30	Cementitious materials for concrete shaft lining	D-8140	423	tons	\$150.00	\$63,450.00
	31	Furnish and install concrete reinforcement	D-8140	18,700	lin ft	\$1.00	\$18,700.00
	32	Furnish & install 1-in dia, 12-ft long rock bolts	D-8140	4,800	lin ft	\$60.00	\$288,000.00
	33	Furnish and install chain link protection	D-8140	76,600	sq yd	\$20.00	\$1,532,000.00
		Black Rock Outflow Conveyance Subtotal					\$306,402,600.00

QUANTITIES		PRICES	
BY Bill Thompson	CHECKED <i>KA</i>	BY D. Donaldson <i>Dee</i>	CHECKED BDV 8/17/04
DATE PREPARED 4/19/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs

Civil/Site

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Road (60 ft of 24ft wide bituminous surface):					
	1	Clear roadway alignment	D8120	1,440	SF	\$1.00	\$1,440.00
	2	Furnish and place base course material (9-inch depth)	D8120	75	TONS	\$20.00	\$1,500.00
	3	Furnish and place asphalt concrete (6-inch depth)	D8120	55	TONS	\$100.00	\$5,500.00
		Service Yard (6" asphalt concrete surface)					
		Assume T.O Yard= El 1176.0					
	4	Strip and clear pumping plant site to 1 foot depth	D8120	7,850	CY	\$5.00	\$39,250.00
	5	Common excavation to Yard (25% Strip & Clear)	D8120	2,000	CY	\$7.00	\$14,000.00
	6	Place and compact embankment for yard (25% Exc.)	D8120	500	CY	\$12.00	\$6,000.00
	7	Furnish and place base course material (6-inch)	D8120	4,600	TONS	\$20.00	\$92,000.00
	8	Furnish and place asphalt concrete (6-inch)	D8120	5,100	TONS	\$100.00	\$510,000.00
	9	Furnish and install 7-foot chain link fence for PP Yard	D8120	1,900	LF	\$20.00	\$38,000.00
	10	Furnish and install 7-foot x 24-foot access gates	D8120	3	EA	\$3,500.00	\$10,500.00
		Diversion During Construction:					
		Assume need to pass 900 cfs canal flow during construction. Assume local borrow.					
		Assume no dewatering required.					
	11	Construct U/S & D/S earth cofferdams. (Height=15 ft)	D8120	2,000	CY	\$15.00	\$30,000.00
	12	F&I impervious geomembrane on cofferdams.	D8120	350	SY	\$15.00	\$5,250.00
	13	F&I three 9-ft dia. X .138-in galv., corrugated metal pipes btwn cofferdams. Wt/Ft= 210 lbs/ft.	D8120	1,000	LF	\$500.00	\$500,000.00
	14	Remove cofferdams and diversion structures	D8120	1	LS	\$20,000.00	\$20,000.00
		Sheet Subtotal					\$1,273,440.00

QUANTITIES			PRICES	
BY	Dick LaFond	CHECKED	BY	D. Donaldson <i>DCD</i>
DATE PREPARED	6/3/04	PEER REVIEW	DATE PREPARED	08/17/04
			CHECKED	<i>BBW</i> 8/17/04
			PEER REVIEW	<i>g</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q= 900 cfs Structural and Architectural			Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL:		Appraisal
			FILE: C:\Documents and Settings\bjvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Concrete Tailrace Lining and Retaining Walls					
		Assume lining is 1-foot thick w/ #6@12" EW EF, 1.5:1 side slopes					
	29	Furnish, form, and place reinforced concrete lining in excavated channel (f'c= 4 ksi)	D8120	2,000	CY	\$400.00	\$800,000.00
	30	Furnish, form, and place reinforced concrete walls	D8120	1,500	CY	\$400.00	\$600,000.00
	31	Furnish and place concrete reinforcement. Assume 130 #/CY	D8120	455,000	LBS	\$0.80	\$364,000.00
	32	Furnish and handle cement (.282T/CY)	D8120	980	TONS	\$140.00	\$137,200.00
		Construct Powerplant and Bypass Substructure					
	33	Furnish, form, and place reinforced concrete	D8120	14,500	CY	\$350.00	\$5,075,000.00
	34	Furnish and place concrete reinforcement. Assume 120 #/CY	D8120	1,740,000	LBS	\$0.65	\$1,131,000.00
	35	Furnish and handle cement (.282T/CY)	D8120	4,090	TONS	\$120.00	\$490,800.00
		Construct Powerplant and Bypass Superstructure					
	36	212.5-ft x 73.5-ft x 42-ft high superstructure Structural steel superstructure with CMU walls. Stepped columns for 90T crane support Built-up roof on metal roof deck.	D8120	15,620	SF	\$100.00	\$1,562,000.00
		Sheet Subtotal					\$10,160,000.00
QUANTITIES			PRICES				
BY	Dick LaFond	CHECKED	D. Donaldson		CHECKED	8/17/04	
DATE PREPARED	6/4/04	PEER REVIEW	DATE PREPARED		PEER REVIEW		

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock
 Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

Structural and Architectural

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL (cont.)					
		Construct Pipe Encasements in Yard					
	37	Furnish, form, and place reinforced concrete	D8120	3,100	CY	\$400.00	\$1,240,000.00
	38	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	341,000	LBS	\$0.80	\$272,800.00
	39	Furnish and handle cement (.282T/CY)	D8120	874	TONS	\$140.00	\$122,360.00
		Structural Steel					
	40	Furnish and install structural steel (painted): Includes crane girder, rail, and hoist frames. Does not include typ. building framework.	D8120	175,000	LBS	\$4.00	\$700,000.00
		Miscellaneous Metalwork					
	41	Furnish and install miscellaneous metalwork Includes grating, hatches, ladders, guardrail, and cable trays	D8120	45,000	LBS	\$7.00	\$315,000.00
	42	Motor-operated, exterior insulated roll-up door 18' x 20'	D8120	1	EA	\$10,000.00	\$10,000.00
		Plant - Civil and Structural Subtotal					\$19,925,100.00

QUANTITIES

PRICES

BY Dick Lafond	CHECKED <i>M.R. C'Sh...</i>	BY D. Donaldson <i>DD</i>	CHECKED <i>604 8/17/04</i>
DATE PREPARED 5/15/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE: Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q= 900 cfs Mechanical				PROJECT: Yakima River Basin Water Storage Options			
				REGION PN PRICE LEVEL: Appraisal			
				FILE: C:\Documents and Settings\lvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary			
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Furnish and install the following:					
		Steel Penstock:					
		Steel plate used for pipe fabrication:					
		ASTM A36: Sy = 36 kpsi					
		(All pipe sizes are inside diameters)					
	4	204" Dia., 1 15/16" wall, L= 4,993 ft., 4265 lbs/ft	D8420	21,300,000	LBS	\$2.00	\$42,600,000.00
	5	84" Dia., 13/16" wall, L= 492 ft., 737 lbs/ft	D8420	363,000	LBS	\$2.00	\$726,000.00
		Stainless Steel Stilling Basin for Sleeve Valves:					
		ASTM 316L Stainless steel plate					
	6	Four - 396" Dia., 1 1/4" wall cylindrical tanks with baseplates:					
		Each tank height = 20 feet					
		Total weight for four tanks = 1,180,000 lbs.	D8420	1,180,000	LBS	\$15.00	\$17,700,000.00
		Sleeve valves with hydraulic operators:					
	7	Four - 84" Dia. Inlet X 72" Dia. Outlet Valves	D8420	280,000	LBS	\$15.00	\$4,200,000.00
		ASTM 316L Stainless steel plate					
		Each valve weight = 70,000					
		Total weight for four valves = 280,000 lbs.					
		Spherical valves with hydraulic operators:					
	8	Sleeve valve guard valves	D8420	240,000	LBS	\$10.00	\$2,400,000.00
		Four - 60" Dia. Spherical valves with hydraulic operators					
		60,000 lbs. per valve					
		Turbine guard valve					
	9	One - 84" Dia. Spherical valve with hydraulic operator	D8420	140,000	LBS	\$10.00	\$1,400,000.00
		140,000 lbs. per valve					
		Sunnyside Power Plant Isolation Valve					
	10	One - 84" Dia. Spherical valve with hydraulic operator	D8420	140,000	LBS	\$10.00	\$1,400,000.00
		140,000 lbs. per valve					
Sheet Subtotal							\$70,426,000.00
QUANTITIES				PRICES			
BY Nathan Nakamoto, D8420		CHECKED Rick Frisz, D8420		BY D. Donaldson <i>[Signature]</i>		CHECKED <i>[Signature]</i> 8/17/04	
DATE PREPARED 5/26/04				DATE PREPARED 08/17/04		PEER REVIEW <i>[Signature]</i>	

ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs

Mechanical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\Priest Rapids PP_3500 Rev 1.x\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	10	Furnishing and installing one 90-Ton overhead crane, 67.5' span	D-8410	157,500	LBS	\$6.00	\$945,000.00
	11	Furnishing and installing Hydraulic elevator capacity = 3500 pounds, travel = 31 ft. landings = 3, speed = 100 ft/min.	D-8410	1	unit	\$400,000.00	\$400,000.00
	12	Bulkhead gates and guides at turbine (steel) (assumes 3 bays of guides and 3 bulkhead gates)	D-8410	31,000	LBS	\$4.00	\$124,000.00
	13	Monorail hoist for bulkhead gate, electric wire rope, motorized trolley, 5-ton capacity	D-8410	1,500	LBS	\$20.00	\$30,000.00
	14	Stoplogs, lifting beam & guides at sleeve valves eight bays for guides, 2 bays of stoplogs (steel)	D-8410	152,000	LBS	\$4.00	\$608,000.00
	15	CO2 High Pressure Fire Extinguishing System: 12 - 100# Storage Cylinders w/ control panel and appurtenances and 400 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$36,000.00
	16	Fire Suppression System: 3 Fire hose reels w/ 100 feet of hose 12 - Portable hand-held 20# extinguishers 2,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$50,000.00
	17	Unit Cooling Water System: 2 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 1,000 lbs. of type K copper tubing, valves & fittings 4,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$130,000.00
	18	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 1,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$20,000.00
		Sheet Subtotal					\$2,343,000.00

QUANTITIES**PRICES**

BY R Christensen, B Sund C Berte, J Gruss	CHECKED <i>AME</i>	BY D. Donaldson <i>DD</i>	CHECKED BOV 8/17/04
DATE PREPARED 5/3/2004	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>y</i>

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Roza Canal Powerplant, Bypass, and Switchyard Outflow Conveyance System - Q= 2,500 cfs Powerplant Design Flow - Q= 900 cfs			Yakima River Basin Water Storage Options				
Mechanical			REGION	PN	PRICE LEVEL:	Appraisal	
			FILE: C:\Documents and Settings\bvanotte\Desktop\Black Rock\Black Rock Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	19	Compressed Air System: 2 - 100 cfm @ 125 psi rotary screw air compressors 1 - 250 gal. carbon steel air receiver 1 - 100 cfm air dryer 500 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$50,000.00
	20	Service Water System: 1 - Service water pump, 75 gpm @ 200 ft. of head 1 - Hydropneumatic Tank, 300 gal. 750 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	21	Gravity Drainage System: 12 - Floor drains, cast iron 5,000 lbs. of cast iron hub & spigot, service weight soil pipe	D-8410	1	L.S.		\$50,000.00
	22	Plant Unwatering System: 2 - Vertical turbine type sump pump, 500 gpm @ 50 ft hd 1 - Drainage jet type drainage pump 1,000 lbs. of type K copper tube, valves & fittings 3,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	each		\$70,000.00
	23	Domestic Water and Sanitary Waste System: 2 - Water Closets 1 - Urinal 2 - Lavatories & accessories 1 - Duplex Sewage Ejector 2,000 lbs. of cast iron hub & spigot service weight sewer pipe 400 lbs. of type K copper tubing, valves & fittings	D-8410	1	each		\$50,000.00
Sheet Subtotal							\$320,000.00
QUANTITIES			PRICES				
BY J Grass		CHECKED Aur	BY D. Donaldson		CHECKED BOV 8/17/04		
DATE PREPARED 5/27/04		PEER REVIEW	DATE PREPARED 08/17/04		PEER REVIEW		

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs

Electrical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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 Revisions\Priest Rapids PP_3500 Rev 1.xls\Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Plant Battery System (F&I)	D8430				
	11	125 volt, 300 ampere-hour, lead-acid battery		1	EA	\$25,000.00	\$25,000.00
	12	Battery chargers		2	EA	\$8,000.00	\$16,000.00
	13	DC distribution panelboard, 100 ampere mains, and molded-case circuit breakers		1	EA	\$12,500.00	\$12,500.00
		Plant Station-Service Equipment (F&I)	D8430				
		Indoor secondary unit substation with following features:					
	14	Dry-type transformer, 6.9 kV-480Y/277, 1500 kVA		1	EA	\$55,000.00	\$55,000.00
	15	480 volt power-circuit breakers, 600 amperes		5	EA	\$4,000.00	\$20,000.00
		Building Lighting System (F&I)	D8430				
		Interior luminaires					
	16	High bay, high-pressure sodium, 400 Watt 480 volt, 1-phase		24	EA	\$700.00	\$16,800.00
	17	4 foot fluorescent lighting fixtures, 2 lamps		36	EA	\$220.00	\$7,920.00
	18	Emergency lighting system		1	LS	\$900.00	\$900.00
		Exterior luminaires					
	19	High-pressure sodium, wall-mounted, outdoor type 70 watt, 120 volt		12	EA	\$400.00	\$4,800.00
	20	Building Fire Detection & Alarm System (F&I)	D8430	1	LS	\$150,000	\$150,000.00
		Distribution Panelboards (F&I)	D8430				
	21	480-volts, 3-phase, 400 ampere bus, indoor type with 12 molded-case circuit breakers		2	EA	\$30,000.00	\$60,000.00
		Motor Control Center (F&I)	D8430				
	22	480 volts, 3-phase, 1600 ampere main bus Six 20 inch wide sections		1	EA	\$195,000	\$195,000.00
		Sheet Subtotal					\$563,920.00

QUANTITIES**PRICES**

BY M. Schuh D8430	CHECKED <i>L. Rossi</i>	BY <i>Deb for</i> Elizabeth Tran	CHECKED <i>DDJ 6/17/03</i>
DATE PREPARED 5/27/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>g</i>

FEATURE:

Roza Canal Powerplant, Bypass, and Switchyard
 Outflow Conveyance System - Q= 2,500 cfs
 Powerplant Design Flow - Q= 900 cfs

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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Switchyard and Transmission Line

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Switchyard					
		Furnish and Install:					
	1	Oil-filled power transformer 25 MVA: 34.5-6.9kV, 3-phase	D8440	1	EA	\$450,000	\$450,000.00
	2	F&I 34.5-KV PRIMARY UNIT SUBSTATION: 'INCOMING 34.5KV SECTION/BUS/INTERRUPTER 'OUTGOING 6.9KV SECTION/BUS/INTERRUPTER 'SURGE ARRESTORS, 30KV	D8440	1	EA	\$375,000	\$375,000.00
		Tap at existing 34.5-kV line					
		Furnish and Install:					
	3	Wood-pole tap structure	D8440	1	EA	\$9,000.00	\$9,000.00
	4	Construct Transmission Line Assume 1000 feet of transmission line from existing 34.5-kV line wood poles, 1115 AWG conductor	D8440	1,000	FT	\$40.00	\$40,000.00
		Switchyard & Transmission Line Subtotal					\$874,000.00

QUANTITIES**PRICES**

BY L. Gamuciello	CHECKED	BY <i>Red for</i> Elizabeth Tran	CHECKED 6/17/04
DATE PREPARED 5/27/04	PEER REVIEW James R. Zeiger	DATE PREPARED 08/17/04	PEER REVIEW <i>gy</i>

Sunnyside Powerplant, Bypass, and Switchyard

$$Q_{(\text{Bypass})} = 1,250 \text{ cfs}$$

$$Q_{(\text{Power Plant})} = 900 \text{ cfs}$$

Field Cost Estimate

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Assessment Study			Yakima River Basin Water Storage Options				
Sunnyside Canal Powerplant, Byapss, and Switchyard			REGION	PN	PRICE LEVEL:	Appraisal	
Summary			FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\BR_SunnysidePP_1 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Subtotal					\$2,320,815.00
		Structural & Architectural Subtotal					\$5,365,170.00
		Mechanical Subtotal					\$19,621,400.00
		Electrical Subtotal					\$3,761,065.00
		Switchyard & Transmission Line Subtotal					\$1,234,000.00
		Subtotal					\$32,302,450.00
		Mobilization +/- 5%					\$1,600,000.00
		Subtotal w/ mobilization					\$33,902,450.00
		Unlisted Items +/- 10%					\$3,097,550.00
		CONTRACT COST					\$37,000,000.00
		Contingencies +/- 25%					\$10,000,000.00
		FIELD COST					\$47,000,000.00
QUANTITIES			PRICES				
BY	CHECKED	BY	CHECKED	DATE PREPARED		PEER REVIEW	
				08/17/04			

ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Assessment Study			Yakima River Basin Water Storage Options				
Sunnyside Canal Powerplant, Bypass, and Switchyard			REGION PN		PRICE LEVEL: Appraisal		
Civil/Site			FILE: C:\Documents and Settings\avanotte\Desktop\Black Rock\Black Rock Revisions\BR_SunnysidePP_1 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Road (60 ft of 24ft wide bituminous surface):					
	1	Clear roadway alignment	D8120	1,440	SF	\$1.00	\$1,440.00
	2	Furnish and place base course material (9-inch depth)	D8120	75	TONS	\$20.00	\$1,500.00
	3	Furnish and place asphalt concrete (6-inch depth)	D8120	55	TONS	\$100.00	\$5,500.00
		Service Yard (6" asphalt concrete surface)					
		Assume T.O Ground= T.O Yard= El 894.5					
	4	Strip and clear pumping plant site to 1 foot depth	D8120	3,900	CY	\$5.00	\$19,500.00
	5	Common excavation to Yard ($\pm 50\%$ Strip & Clear)	D8120	2,000	CY	\$7.00	\$14,000.00
	6	Place and compact embankment for yard (50% Exc.)	D8120	1,000	CY	\$12.00	\$12,000.00
	7	Furnish and place base course material (6-inch)	D8120	3,600	TONS	\$20.00	\$72,000.00
	8	Furnish and place asphalt concrete (6-inch)	D8120	4,000	TONS	\$100.00	\$400,000.00
	9	Furnish and install 7-foot chain link fence for PP Yard	D8120	1,400	LF	\$20.00	\$28,000.00
	10	Furnish and install 7-foot x 24-foot access gates	D8120	3	EA	\$3,500.00	\$10,500.00
		Diversion During Construction:					
		Assume need to pass 900 cfs canal flow during construction. Assume local borrow.					
		Assume no dewatering required.					
	11	Construct U/S & D/S earth cofferdams. (Height=15 ft)	D8120	2,000	CY	\$15.00	\$30,000.00
	12	F&I impervious geomembrane on cofferdams.	D8120	350	SY	\$15.00	\$5,250.00
	13	F&I three 9-ft dia. X .138-in galv., corrugated metal pipes btwn cofferdams. Wt/Ft= 210 lbs/ft.	D8120	1,000	LF	\$500.00	\$500,000.00
	14	Remove cofferdams and diversion structures	D8120	1	LS		\$20,000.00
		Sheet Subtotal					\$1,119,690.00
QUANTITIES			PRICES				
BY	Dick LaFond	CHECKED	BY		CHECKED		
		<i>M.R. O'Shea</i>	<i>Craig A. Grush</i>		<i>804 8/17/04</i>		
DATE PREPARED	5/15/04	PEER REVIEW	DATE PREPARED		PEER REVIEW		
			08/17/04		<i>ack</i>		

ESTIMATE WORKSHEET

FEATURE: Black Rock Assessment Study Sunnyside Canal Powerplant, Byapss, and Switchyard Civil/Site			PROJECT: Yakima River Basin Water Storage Options				
			REGION	PN	PRICE LEVEL: Appraisal		
			FILE: C:\Documents and Settings\hvanotte\Desktop\Black Rock\Black Rock Revisions\BR_SunnysidePP_1 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Tailrace Channel (Unlined)					
		Assume T.O. Rock El. 880					
		Assume stockpile rock and common material for reuse.					
	15	Common excavation for tailrace channel	D8120	3,800	CY	\$5.00	\$19,000.00
	16	Rock excavation for tailrace channel (drill and shoot)	D8120	1,900	CY	\$45.00	\$85,500.00
	17	Furnish and place riprap bedding (1-ft depth)	D8120	700	CY	\$30.00	\$21,000.00
	18	Furnish and place riprap (2-ft depth)	D8120	1,400	CY	\$35.00	\$49,000.00
		Structural Excavation and Backfill					
		Assume T. O Rock El. 880.0					
		Assume stockpile rock for later use as riprap.					
	19	Common excavation for structures	D8120	12,800	CY	\$12.00	\$153,600.00
	20	Rock excavation for structures (drill & shoot)	D8120	18,150	CY	\$30.00	\$544,500.00
	21	Furnish backfill for structures (reuse excavation)	D8120	5,675	CY	\$6.00	\$34,050.00
	22	Place backfill around structures	D8120	5,675	CY	Included above	
	23	Compact backfill around structures	D8120	5,675	CY	\$8.00	\$45,400.00
		Pipe Trench Excavation and Backfill					
	24	Common excavation for pipe in Service Yard	D8120	6,900	CY	\$10.00	\$69,000.00
	25	Rock Excavation for pipe in Service Yard	D8120	2,270	CY	\$45.00	\$102,150.00
	26	Furnish, place, & compact backfill for pipe (local)	D8120	6,425	CY	\$6.00	\$38,550.00
	27	Furnish & place soil cement for pipe	D8120	525	CY	\$75.00	\$39,375.00
		Sitework Subtotal					\$2,320,815.00
QUANTITIES			PRICES				
BY Dick LaFond	CHECKED <i>Mr. C. Stone</i>		BY <i>G</i> Craig A. Grush	CHECKED <i>601 8/17/04</i>			
DATE PREPARED 5/15/04	PEER REVIEW		DATE PREPARED 08/17/04	PEER REVIEW <i>Bob</i>			

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Bypass, and Switchyard

Structural and Architectural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Concrete Tailrace Structure					
	1	Furnish, form, and place reinforced concrete	D8120	560	CY	\$400.00	\$224,000.00
	2	Furnish and place concrete reinforcement.	D8120	72,800	LBS	\$1.00	\$72,800.00
		Assume 130 #/CY					
	3	Furnish and handle cement (.282T/CY)	D8120	158	TONS	\$160.00	\$25,280.00
		Construct Powerplant Substructure					
	4	Furnish, form, and place reinforced concrete	D8120	3,140	CY	\$400.00	\$1,256,000.00
	5	Furnish and place concrete reinforcement.	D8120	376,800	LBS	\$0.80	\$301,440.00
		Assume 120 #/CY					
	6	Furnish and handle cement (.282T/CY)	D8120	885	TONS	\$140.00	\$123,900.00
	7	Construct Powerplant Superstructure	D8120	4,500	SF	\$100.00	\$450,000.00
		72.5-ft x 62-ft x 37-ft high superstructure					
		Structural steel superstructure with CMU walls.					
		Stepped columns for 125T crane support					
		Built-up roof on metal roof deck.					
		Construct Bypass Substructure					
	8	Furnish, form, and place reinforced concrete	D8120	3,375	CY	\$400.00	\$1,350,000.00
	9	Furnish and place concrete reinforcement.	D8120	405,000	LBS	\$0.80	\$324,000.00
		Assume 120 #/CY					
	10	Furnish and handle cement (.282T/CY)	D8120	950	TONS	\$140.00	\$133,000.00
	11	Construct Bypass Superstructure	D8120	2,740	SF	\$100.00	\$274,000.00
		74.0-ft x 37-ft x 16-ft high superstructure					
		Built-up roof on metal roof deck supported by open					
		web joists. CMU bearing walls. No crane.					
		Sheet Subtotal					\$4,534,420.00

QUANTITIES**PRICES**

BY Dick Lafond

CHECKED

M.R. C. Shum

BY

Craig A. Grush

CHECKED

BOV 8/17/04

DATE PREPARED

5/15/04

PEER REVIEW

DATE PREPARED

08/17/04

PEER REVIEW

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Byapss, and Switchyard

Structural and Architectural

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL (cont.)					
		Construct Pipe Encasements					
	12	Furnish, form, and place reinforced concrete	D8120	1,050	CY	\$400.00	\$420,000.00
	13	Furnish and place concrete reinforcement. Assume 110 #/CY	D8120	115,500	LBS	\$1.00	\$115,500.00
	14	Furnish and handle cement (.282T/CY)	D8120	295	TONS	\$150.00	\$44,250.00
		Structural Steel					
	15	Furnish and install structural steel (painted): Includes crane girder, rail, and hoist frames. Does not include typ. building framework.	D8120	34,000	LBS	\$4.00	\$136,000.00
		Miscellaneous Metalwork					
	16	Furnish and install miscellaneous metalwork Includes grating, hatches, ladders, guardrail, and cable trays	D8120	15,000	LBS	\$7.00	\$105,000.00
	17	Motor-operated, exterior insulated roll-up door 18' x 20'	D8120	1	EA	\$10,000.00	\$10,000.00
		Structural & Architectural Subtotal					\$5,365,170.00

QUANTITIES


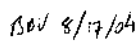

PRICES

BY Dick LaFond	CHECKED <i>M.R. O'Shea</i>	BY <i>G</i> Craig A. Grush	CHECKED <i>BOV 8/17/04</i>
DATE PREPARED 5/15/04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>BOV</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:			PROJECT:				
Black Rock Assessment Study			Yakima River Basin Water Storage Options				
Sunnyside Canal Powerplant, Bypass, and Switchyard			REGION PN		PRICE LEVEL: Appraisal		
Mechanical			FILE: C:\Documents and Settings\byanotte\Desktop\Black Rock\Black Rock Revisions\BR_SunnysidePP_1 Rev 1.xls\Summary				
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Furnish and install the following:					
		Steel Penstock:					
		Steel plate used for pipe fabrication:					
		ASTM A36: Sy = 36 kpsi					
		(All pipe sizes are inside diameters)					
	4	144" Dia., 2 1/4" wall, L= 252 ft.	D8420	890,000	LBS	\$2.00	\$1,780,000.00
	5	84" Dia., 1 5/16" wall, L= 311 ft.	D8420	665,000	LBS	\$2.00	\$1,330,000.00
	6	144" Dia., 3/4" wall, L= 132 ft.	D8420	155,000	LBS	\$2.00	\$310,000.00
		Stainless Steel Stilling Basin for Sleeve Valves:					
		ASTM 316L Stainless steel plate					
	7	Two - 396" Dia., 1 1/4" wall cylindrical tanks with baseplates:	D8420	295,000	LBS	\$15.00	\$4,425,000.00
		Each tank height = 20 feet					
		Total weight for both tanks = 295,000 lbs.					
		Sleeve valves with hydraulic operators:					
	8	Two - 84" Dia. Inlet X 72" Dia. Outlet Valves	D8420	140,000	LBS	\$15.00	\$2,100,000.00
		ASTM 316L Stainless steel plate					
		Each valve weight = 70,000					
		Total weight for both valves = 140,000 lbs.					
		Spherical valves with hydraulic operators:					
	9	Sleeve valve guard valves	D8420	120,000	LBS	\$10.00	\$1,200,000.00
		Two - 60" Dia. Spherical valves with hydraulic operators					
		60,000 lbs. per valve					
		Turbine guard valve					
	10	One - 78" Dia. Spherical valve with hydraulic operator	D8420	115,000	LBS	\$10.00	\$1,150,000.00
		115,000 lbs. per valve					
		Sheet Subtotal					\$12,295,000.00
QUANTITIES			PRICES				
BY Nathan Nakamoto, D8420		CHECKED Rick Frisz, D8420	BY  Craig A. Grush		CHECKED  Bob 8/17/04		
DATE PREPARED 5/6/04			DATE PREPARED 08/17/04		PEER REVIEW  Bob		

ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Byapss, and Switchyard

Mechanical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	11	Furnishing and installing one 125-Ton overhead crane, 50' span	D-8410	153.000	LBS	\$6.00	\$918,000.00
	12	Furnishing and installing Hydraulic elevator capacity = 3500 pounds, travel = 31 ft. landings = 3, speed = 100 ft/min.	D-8410	1	unit	\$400,000	\$400,000.00
	13	Bulkhead gates and guides at power plant (steel) (assumes two gates)	D-8410	25,000	LBS	\$4.00	\$100,000.00
	14	Two fixed hoists for bulkhead gates, 2-ton capacity (each hoist weighs 200 lbs)	D-8410	400	LBS	\$50.00	\$20,000.00
	15	Bulkhead gate, liftn beam & guides at sleeve valve pipe discharge to canal (steel)	D-8410	32,000	LBS	\$4.00	\$128,000.00
	16	CO2 High Pressure Fire Extinguishing System: 10 - 100# Storage Cylinders w/ control panel and appurtenances and 300 lbs. of sch. 80 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$30,000.00
	17	Fire Suppression System: 3 Fire hose reels w/ 100 feet of hose 12 - Portable hand-held 20# extinguishers 2,000 lbs. of sch. 40 carbon steel pipe, valves & fittings 1 - Fire pump, split-case, 500 gpm @ 300 ft of head	D-8410	1	L.S.		\$50,000.00
	18	Unit Cooling Water System: 2 - Cooling water pumps, end-suction type, 150 gpm 2 - 8-inch automatic, self-cleaning strainers 1,000 lbs. of type K copper tubing, valves & fittings 4,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$130,000.00
	19	Lubricating Oil System: 2- 500 gal carbon steel storage tanks 1 - 10 gpm @ 100 psi oil pump 1 - lube oil filter 1,000 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$20,000.00
		Sheet Subtotal					\$1,796,000.00

QUANTITIES

PRICES

BY R Christensen, B Sund C Berte, J Grass	CHECKED <i>Aux</i>	BY <i>g</i> Craig A. Grush	CHECKED BOJ 5/17/04
DATE PREPARED 5/3/2004	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Red</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Byapss, and Switchyard

Mechanical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

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Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	20	Compressed Air System: 2 - 100 cfm @ 125 psi rotary screw air compressors 1 - 250 gal. carbon steel air receiver 1 - 100 cfm air dryer 500 lbs. of sch. 40 carbon steel pipe, valves & fittings	D-8410	1	L.S.		\$50,000.00
	21	Service Water System: 1 - Service water pump, 75 gpm @ 200 ft. of head 1 - Hydropneumatic Tank, 300 gal. 750 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$100,000.00
	22	Gravity Drainage System: 12 - Floor drains, cast iron 5,000 lbs. of cast iron hub & spigot, service weight soil pipe	D-8410	1	L.S.		\$50,000.00
	23	Plant Unwatering System: 2 - Vertical turbine type sump pump, 500 gpm @ 50 ft hd 1 - Drainage jet type drainage pump 1,000 lbs. of type K copper tube, valves & fittings 3,000 lbs. of ductile iron, mechanical joint pipe & fittings	D-8410	1	L.S.		\$70,000.00
	24	Domestic Water and Sanitary Waste System: 2 - Water Closets 1 - Urinal 2 - Lavatories & accessories 1 - Duplex Sewage Ejector 2,000 lbs. of cast iron hub & spigot service weight sewer pipe 400 lbs. of type K copper tubing, valves & fittings	D-8410	1	L.S.		\$50,000.00
Sheet Subtotal							\$320,000.00

QUANTITIES

PRICES

BY J Grass	CHECKED <i>jar</i>	BY <i>Y</i> Craig A. Grush	CHECKED BOV 4/17/04
DATE PREPARED 5/3/2004	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>per</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Bypass, and Switchyard

Electrical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Electrical Generator (F&I) 30,000 kVA, 6,900 volts, 3-phase, 60 Hz 400 rpm, 95 % power factor Vertical, synchronous machine Static excitation system & voltage regulator	D8430	1	EA	\$1,700,000	\$1,700,000.00
	2	Plant Grounding System (F&I) Ground rods, 10 ft, 3/4" dia, copper-clad Stranded bare-copper conductor:	D8430	30	EA	\$180.00	\$5,400.00
	3	250 MCM		1,200	LF	\$5.50	\$6,600.00
	4	4/0 AWG		800	LF	\$4.00	\$3,200.00
	5	2/0 AWG		500	LF	\$3.50	\$1,750.00
	6	4 AWG		800	LF	\$2.50	\$2,000.00
	7	Generator Bus & Metal-Enclosed Switchgear (F&I) Generator non-segregated phase bus: 15 kV, 3000 amperes, 3-phase, 60 Hz	D8430	250	LF	\$1,400.00	\$350,000.00
	8	Generator power circuit breaker: 15 kV, 3000 amperes, 3-phase, vacuum type		1	EA	\$730,000	\$730,000.00
	9	Station-service fused interrupter switch: 15 kV, 600 ampere, 3-phase, w/ power fuses		1	EA	\$30,000.00	\$30,000.00
	10	Generator Control Equipment (F&I) Duplex control switchboard for operation of the generator	D8430	1	EA	\$300,000	\$300,000.00
Sheet Subtotal							\$3,128,950.00

QUANTITIES**PRICES**

BY M. Schuh D8430	CHECKED <i>L Roni</i>	BY <i>G Fr.</i> Elizabeth Tran	CHECKED <i>BMV 8/17/04</i>
DATE PREPARED 30 APR 04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DEL</i>

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Bypass, and Switchyard

Electrical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Plant Battery System (F&I)	D8430				
	11	125 volt, 300 ampere-hour, lead-acid battery		1	EA	\$25,000.00	\$25,000.00
	12	Battery chargers		2	EA	\$8,000.00	\$16,000.00
	13	DC distribution panelboard, 100 ampere mains, and molded-case circuit breakers		1	EA	\$12,500.00	\$12,500.00
		Plant Station-Service Equipment (F&I)	D8430				
		Indoor secondary unit substation with following features:					
	14	Dry-type transformer, 6.9 kV-480Y/277, 1000 kVA		1	EA	\$55,000.00	\$55,000.00
	15	480 volt power-circuit breakers, 600 amperes		5	EA	\$4,000.00	\$20,000.00
		Building Lighting System (F&I)	D8430				
		Interior luminaires					
	16	High bay, high-pressure sodium, 400 Watt 480 volt, 1-phase		20	EA	\$700.00	\$14,000.00
	17	Emergency lighting system		1	LS		\$900.00
		Exterior luminaires					
	18	High-pressure sodium, wall-mounted, outdoor type 70 watt, 120 volt		12	EA	\$400.00	\$4,800.00
	19	Building Fire Detection & Alarm System (F&I)	D8430	1	LS		\$150,000.00
		Distribution Panelboards (F&I)	D8430				
	20	480-volts, 3-phase, 400 ampere bus, indoor type with molded-case circuit breakers		2	EA	\$24,500.00	\$49,000.00
		Motor Control Center (F&I)	D8430				
	21	480 volts, 3-phase, 1200 ampere main bus Four 20 inch wide sections		1	EA	\$110,000	\$110,000.00
		Sheet Subtotal					\$457,200.00

QUANTITIES**PRICES**

BY M. Schuh D8430	CHECKED <i>L Roni</i>	BY <i>G. Tran</i> Elizabeth Tran	CHECKED BOV 8/17/04
DATE PREPARED 30 APR 04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>DeD</i>

ESTIMATE WORKSHEET

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ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Bypass, and Switchyard

Electrical

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Bypass Structure Electrical System					
		Service Equipment (F&I)	D8430				
	37	Distribution panelboard, indoor type 480 volts, 3-phase, 225 ampere bus, with molded-case circuit breakers		1	EA	\$22,000.00	\$22,000.00
		Transformer load center					
	40	15 kVA, 1-phase, 480-240/120		1	EA	\$11,000.00	\$11,000.00
		Combination Motor Starters (F&I)	D8430				
	41	NEMA size 2 non-reversing contactor, 480-120 volt control transformer NEMA type 12 enclosure		6	EA	\$7,000.00	\$42,000.00
		Building Lighting System (F&I)	D8430				
		Interior luminaires					
	42	Fluorescent fixtures with two 4 foot lamps		8	EA	\$220.00	\$1,760.00
		Exterior luminaires					
	43	High-pressure sodium, wall-mounted, outdoor type 70 watt, 120 volt		6	EA	\$400.00	\$2,400.00
		Insulated Conductors (F&I)	D8430				
		600 volt, single-conductor, stranded copper					
	44	12 AWG		600	FT	\$0.60	\$360.00
	45	10 AWG		400	FT	\$0.70	\$280.00
	46	8 AWG		100	FT	\$1.00	\$100.00
		Conduit System (F&I)	D8430				
		Rigid steel conduit					
	47	1 inch		200	FT	\$15.00	\$3,000.00
		Electrical Subtotal					\$3,761,065.00

QUANTITIES

PRICES

BY M. Schuh D8430	CHECKED <i>L. Rami</i>	BY <i>G. For</i> Elizabeth Tran	CHECKED <i>BOV 8/17/04</i>
DATE PREPARED 30 APR 04	PEER REVIEW	DATE PREPARED 08/17/04	PEER REVIEW <i>Red</i>

ESTIMATE WORKSHEET

FEATURE:

Black Rock Assessment Study

Sunnyside Canal Powerplant, Byapss, and Switchyard

Switchyard and Transmission Line

PROJECT:

Yakima River Basin Water Storage Options

REGION

PN

PRICE LEVEL:

Appraisal

FILE:

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power transformer 40 MVA; 69-6.9kV, 3-phase	D8440	1	EA	\$540,000	\$540,000.00
	2	69-kV disconnect switches, 1200 amp, 3-phase	D8440	2	EA	\$36,000.00	\$72,000.00
	3	69-kV circuit breakers, 1200 amp, 3-phase	D8440	1	EA	\$200,000	\$200,000.00
		Tap at existing 69-kV line					
		Furnish and Install:					
	4	69-kV disconnect switches, 1200 amp, 3-phase	D8440	2	EA	\$36,000.00	\$72,000.00
	5	69-kV circuit breakers, 1200 amp, 3-phase	D8440	1	EA	\$200,000	\$200,000.00
	6	Construct Transmission Line Assume 1 mile of transmission line from existing 69-kV line to the southwest wood poles, 795 AWG conductor	D8440	1	MILES	\$150,000	\$150,000.00
		Switchyard & Transmission Line Subtotal					\$1,234,000.00

QUANTITIES

PRICES

BY

L. Gamuciello

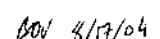
CHECKED

BY



Elizabeth Tran

CHECKED



08/17/04

DATE PREPARED

4/27/2004

PEER REVIEW

James R. Zeiger

DATE PREPARED

08/17/04

PEER REVIEW

